SPORTS CARS ILLUSTRATED'S

CAR and DRIVER

APRIL 1961 · 50¢

MAC 4

ROAD RESEARCH REPORT: HEALEY SPRITE

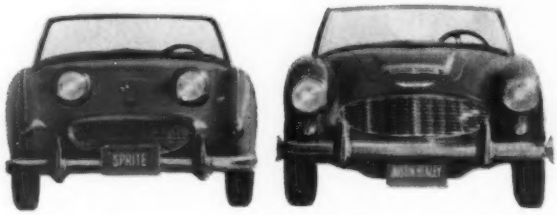
THE MOST FANTASTIC GRAND PRIX CAR... page 50

THE LIBRARY OF CONGRESS SERIAL RECORD
JUN 6 1961
Copy

TRACK-TESTING THE BIRDCAGE MASERATI

BMC has the inside track on outdoor fun!

From Sugarbush Valley to Palm Springs . . . everywhere better sports are found . . . you'll find more BMC sports cars than all others combined. And small wonder! All three of these precision engineered beauties are made by BMC, world's largest and most respected sports car craftsmen. Give yourself a lift! Test drive one of these sizzlers today and experience the exuberance of BMC's inside track on outdoor fun. Your BMC dealer will arrange it.



Austin Healey with disc brakes, 2 seats or 4. Removable hardtop available. From $3051.* *MG* roadster or coupe. Big jet-plane type disc brakes. From $2444.* *Austin Healey Sprite*, the world's lowest priced true sports car. Removable hardtop available. From $1795.* **All prices suggested at east coast P.O.E.*

MG

SPRITE

AUSTIN HEALEY

The MG Roadster at Vermont's fabulous Sugarbush Valley.

Going abroad? Have a BMC car meet you on arrival. Write for details.

Products of **The British Motor Corporation, Ltd.**, makers of MG, Austin Healey, Sprite, Morris and Austin cars. Represented in the United States by Hambro Automotive Corp., Dept. SC-1, 27 West 57th Street, New York 19, N. Y.

FREE! — Make Your Choice From 14 Free Books — FREE!

This is the **biggest multiple-choice Free offer** we have ever made, and every one of the 14 books pictured above is absolutely tops in its field. When you buy from Bob Bentley on the coupon below, **your book purchases accumulate to earn the above FREE books!** For instance, when you purchase $55.00 worth of books on the coupon below, you earn both **Automobile Year, 1961, No. 8,** (reg. price $9.95) and **The Technique of Motor Racing** (reg. price $8.50), provided these are the 2 books you choose out of the 14 top titles offered in this ad. Please read the list given immediately below of the 14 books offered free to find out how your purchase can earn the free books of your choice. Since your book purchases on the coupon below add up to earn free books, **the more books you buy, the more money you save!** We thus pass on to you the economies of handling a many-book purchase **on a single order.** Make out your order right now on the coupon below and mail it to us today: we will send you your books the day we receive your order. (If you prefer, simply write us and list the item numbers and titles you want, referring to this ad: you'll get the same fast efficient service.) By taking advantage of the special offers presented here, you can **save up to 50% on your sports car and motor books.** Please note, **any books offered free are also for sale:** you can, of course, count the purchase of such books toward other **Free** books you want your total purchase to earn.

282 **AUTOMOBILE YEAR, 1961, No. 8,** 9½ inches by 13 inches, published February 1961. The most beautiful, complete and exciting automobile book in the world. The big new edition now ready of the world's handsomest book has everything to fascinate the automobile enthusiast. Its accurate, thorough, profusely-illustrated regular features include: All the new special-body and dream cars; the full, illustrated rundown of International Grand Prix Sports Car Racing for the past year; illustrated catalog of 1961 cars of the world with major specifications; summary of the most important technical changes in the cars, etc. **FREE on purchase of $30.00 worth of books.** Otherwise $9.95

235 **AUTOMOBILE YEAR, 1960, No. 7,** 9½ inches by 13 inches. **FREE on purchase of $30.00 worth of books.** Otherwise $9.95

211 **AUTOMOBILE YEAR, 1959, No. 6,** 9½ inches by 13 inches. **FREE on purchase of $30.00 worth of books.** Otherwise $9.95

164 **AUTOMOBILE YEAR, 1958, No. 5,** 9½ inches by 13 inches. **FREE on purchase of $30.00 worth of books.** Otherwise $9.95

163 **AUTOMOBILE YEAR, 1957, No. 4,** 9½ inches by 13 inches. **FREE on purchase of $30.00 worth of books.** Otherwise $9.95

228 **THE TECHNIQUE OF MOTOR RACING** by Piero Taruffi. Foreword by Fangio, five times World Champion, who calls it "**the textbook of Motor Racing.**" "**Required Reading**" says **Road and Track.** This book is written by a great racing driver who is also a great automobile engineer — a unique combination that makes this book as informative and interesting as Jenkinson's **The Racing Driver: The Theory and Practice of Fast Driving** but with an entirely different point of view. **The Technique of Motor Racing** is a big book, 10 inches by 7½ inches, and contains, along with the text, 40 pages of half-tone illustrations on art paper. **FREE on purchase of $25.00 worth of books.** Otherwise $8.50

Double BONUS—AUTOMOBILE YEAR 1961, No. 8 Now ready. When you buy the brand new **AUTOMOBILE YEAR 1961, No. 8** at $9.95 or get it free under this special offer by purchasing $30.00 worth or more of other books, you can purchase at the same time **AUTOMOBILE YEAR** 1957, 1958, 1959 or 1960 at only $5.95 each. **Buy all your AUTOMOBILE YEARS from us at the lowest prices and earn free books.**

155 **THE SPORTS CAR: ITS DESIGN AND PERFORMANCE** by Colin Campbell, 5¾ inches by 8¾ inches. **New, completely revised and expanded edition!** Recommended by the Technical Correspondence Editor of Road and Track as the best reference book on suspension and chassis design. The first thorough and systematic treatment of the sports car from a technical point of view, yet in a layman's language. **FREE on purchase of $25.00 worth of books.** Otherwise $7.50

200 **THE RACING DRIVER: THE THEORY AND PRACTICE OF FAST DRIVING** by Denis Jenkinson. For expert and novice racing drivers and all sports car enthusiasts who want to practice and understand better the art of fast driving. The author is the only person who has been a racing passenger over and over again with Fangio, Moss, Hawthorn and other top racing drivers. Jenkinson gives you an absolutely unique "eye-witness" report: you sit beside Moss, Fangio and Hawthorn at speed, driving at the limit. Clearly written and a thrilling adventure to read, this big, handsome, hard-covered book (6" x 9" with 35 photographs and diagrams) supplements Taruffi's **Technique of Motor Racing** as it is written from an entirely different point of view. **FREE on purchase of $15.00 worth of books.** Otherwise $5.00

17 **SPORTS CAR RALLIES, TRIALS AND GYMKHANAS** by David Hebb and Arthur Peck. Completely Up-To-Date, Revised Edition of the World-Famous Handbook of Motor Sports. "Sports Car," official organ of the SCCA, says: "Whether you're an expert or a novice, it's for you." **FREE on purchase of $16.00 worth of books.** Otherwise..$6.00

231 **THE FERRARI** by Hans Tanner, 5½ inches by 8¾ inches. An extremely factual and informative work giving technical details and specifications of all the cars that have borne the insignia of the Prancing Horse. For years our friends have asked us for a technical and general book on the Ferrari. This is it — and we are proud to be the publishers of the only book in English on the marque. **FREE on purchase of $20.00 worth of books.** Otherwise $5.50

237 **SPORTS CAR BODYWORK** by B. W. Locke, 6 inches by 9 inches. The only authoritative book for "special" builders and car-restorers. Large fold-out sheets of detailed working drawings, cross-referenced with the text. **FREE on purchase of $25.00 worth of books.** Otherwise.....$8.50

221 **CARE AND REPAIR OF YOUR SPORTS CAR** by OCee Ritch, 5¼ inches by 8 inches. **Long-awaited, just published addition to the Modern Sports Car Series.** A complete, easy-to-understand handbook on the subject for everyone. **FREE on purchase of $10.00 worth of books.** Otherwise $1.95

281 **THE MOTORIST'S WEEKEND BOOK** edited by Michael Frostick and Anthony Harding, 6 inches by 9 inches. Here you will find essays on subjects ranging from Bugatti to broadcasting, road tests to rallying, love to Le Mans, dicing to dress, poetry to picnics, dizzy cartoons to design — contributed by the top automobile writers of the world. **FREE on purchase of $16.00 worth of books.** Otherwise $6.50

286 **HIGH PERFORMANCE CARS 1961,** road tests and special features from **Autosport,** edited by Gregor Grant and John Bolster. Technical drawings by Theo Page, 8½ inches by 11 inches. **FREE on purchase of $10.00 worth of books.** Otherwise $2.00

45 **Automobile Engineer's Reference Book.** New 3rd edition. 59 British automobile specialists contribute half-a-million words in 1696 pages, 1066 diagrams, 262 photos in 30 main sections covering every aspect of the design and production of motor cars $25.00

227 **Nuvolari,** by Count John Lurani $5.00

251 **The Jaguar Companion** $5.00

55 **Modified Motoring,** by John Sprinzel $4.50

141 **Grand Prix Car,** by L. Pomeroy, Vol. 1 $17.50

142 **Grand Prix Car,** by L. Pomeroy, Vol. 2 $20.00

143 **Grand Prix Car,** 2-vol. set $36.50

99 **MG Workshop Manual** from 1929 thru TF $8.50

138 **Design and Tuning of Competition Engines,** by P. Smith. Greatly expanded & revised new edition. Easy to understand, covers the whole field $8.50

10 **VW Workshop Manual** up to January '59 $7.95

28 **The High Speed Internal Combustion Engine,** by Ricardo. The classic work $12.50

179 **Stevens Rally Indicator Model 25,** most accurate computer available, 9-inch diameter..$14.00

225 **Triumph Cars.** A guide to maintenance and repair, all models from 1937 to TR-2/TR-3. .$4.50

35 **The Restoration of Vintage and Thoroughbred Cars,** by Wheatley and Morgan $7.50

266 **Le Mans, The Behind-the-Scenes Story of the Big Race,** by Stirling Moss. Just published..$3.95

MODERN SPORTS CAR SERIES at $1.95 each.
190 Accessories for Your Sports Car. 126 Austin-Healey Guide. 221 Care and Repair of Your Sports Car. 187 The Corvette Guide. 315 Fiat Guide. 316 Formula Junior Guide. 219 Grand Prix Cars. 72 Great Racing Drivers of the World. 59 Guide to Buying A Used Sports Car. 61 A Guide to Competition Driving. 62 A Guide to Rallying. 60 Jaguar Guide. 193 Larry Reid's Rally Tables. 127 Mercedes-Benz Guide. 71 MG Guide. 129 Moments That Made Racing History. 70 Motor Scooter Guide. 69 Porsche Guide. 192 Races that Shook the World. 125 Renault Guide. 285 The Sports Car Club. 258 Sports Car Events. 232 Sports Cars of the Future. 63 Sports Cars of the World. 189 Sports Clothes for Your Sports Car. 220 Triumph Guide. 188 Volkswagen Guide. 314 Volvo Guide. 186 Women in Sports Car Competition. 191 Your Sports Car Engine.

217 **Automobile Year, 1954, No. 1** $9.95

273 **Making the Volkswagen Go!** by Elfrink..$5.00

317 **A Guide to American Sports Car Racing** by Stone, photos by Dain. 125 photographs/diagrams. New $4.50

272 **Porsche Complete Owner's Handbook of Repair and Maintenance,** Includes 1959-1960 and Earlier Models Plus a Special Section on Increasing Power and Performance, by OCee Ritch $4.00

52 **S.U. Carburetter Official Factory Workshop Manual,** by S.U. Carburetter Co. Ltd. **Official** $4.00

254 **My Engine Is Missing.** Homer cartoons..$2.95

151 **The Modern Sports Car,** by McCahill....$3.95

1 **Alf Francis, Racing Mechanic** $6.50

268 **The British Competition Car** $6.50

91 **On the Starting Grid,** by Paul Frere.....$6.50

234 **High Performance Cars, 1960** $2.00

204 **All About The Volkswagen,** by Elfrink...$3.50

175 **Stirling Moss's Book of Motor Sport**.....$3.50

78 **The Racing Car, Development & Design**....$7.50

85 **Tuning and Maintenance of MGA** $5.00

THE MOTOR MANUALS — The up-to-date 4-volume set for the amateur or professional mechanic on any car, Foreign or American.

64 **Motor Manuals. Volume 1. Automobile Engines** in Theory, Design, Construction, Operation and Testing. By A. W. Judge. 474 pg., 323 fig. $6.50

65 **Motor Manuals. Volume 2. Carburetors & Fuel Injection Systems,** The Theory, Practice, Testing, Tuning and Maintenance of Carburetors, Coal and Producer Gas Systems and Petrol-Injection Methods. By A. W. Judge. 496 pg., 316 fig. $6.50

66 **Motor Manuals. Volume 3. The Mechanism of The Car,** Its Principles, Design, Construction and Operation. By A. W. Judge. 544 pg., 401 fig. $6.50

67 **Motor Manuals. Volume 4. Car Maintenance and Repair.** By A. W. Judge. 464 pg., 342 fig. $6.50

216 **Motor Manuals, Four Volume Set** $22.50

269 **Jack Brabham's Motor Racing Book.** New.$4.00

118 **The Life Story of Juan Manuel Fangio**....$2.95

278 **Rolls-Royce,** The Living Legend as Reflected by Half a Century of Contemporary British & American Sales & Institutional Literature..$10.00

74 **Omnibus of Speed,** definitive anthology..$5.95

161 **Beyond Expectation, Volkswagen Story**....$4.00

274 **Speed Was My Life,** by Neubauer. New.$4.00

These manuals are in all cases the OFFICIAL FACTORY MANUALS produced by the automobile manufacturers themselves.

133	Official Austin-Healey 3000 Manual	$12.50
184	Official TR-2/TR-3 Manual	$16.50
181	Official MGA Manual	$12.50
57	Official Complete Jaguar Service Manual for MK VII and XK 120 Models. For XK 140 owners also	$16.50
48	Official Austin-Healey 100-4 Service Manual Thru '56	$12.50
3	Official Austin-Healey 100-6 Manual	$12.50
229	Official Austin-Healey Sprite Manual	$12.50
230	Official MGA Twin Cam Manual	$12.50

Clip or Tear This Coupon
Circle the books you wish!

MAIL TO:

Robert Bentley, Inc.

993 Massachusetts Ave., Cambridge 38, Mass.

I enclose $.....in check or money order.

1 3 10 17 28 35 45 48 52 55 57 59 60 61 62 63 64 65 66 67 69 70 71 72 74 78 85 91 99 118 125 126 127 129 133 138 141 142 143 151 155 161 163 164 175 179 181 184 186 187 188 189 190 191 192 193 200 204 211 216 217 219 220 221 225 227 228 229 230 231 232 234 235 237 251 254 258 266 268 269 272 273 274 278 281 282 285 286 314 315 316 317

Free under offer. Please circle. 17 155 163 164 200 211 221 228 231 235 237 281 282 286

Please supply books circled above. Send to:

Name.....

Street.....

City.....Zone.....State.....

☐ Check for Spec. Del. Add 75c to remittance. CD-41

CAR and DRIVER

FORMERLY SPORTS CARS ILLUSTRATED

April 1961
Vol. 6 No. 10

road research report

Austin-Healey Sprite 58

road tests

Citroen Station Wagon 56
Corvair Monza 72
Driving the Birdcage Maserati .....Karl Ludvigsen 27

men and cars

Uhlenhaut on the New Formula 40
Money Driver .....Steve McNamara 64

features

Maserati Type 63 32
Showtime in New York 33
Enthusiast's Guide to Manhattan 34
Museo dell'Automobile .....Jesse Alexander 42

how to

Competition Tuning: A.C. Bristol .....Wayne Thoms 68

technical

Racing Cycle Engines .....Federico B. Kirbus 36
Chevy Single-Seaters 46
The Most Fantastic Grand Prix Car ...Gianni Rogliatti 50
The Begra Story .....Bryan Webb 66

departments

Observation and Opinion 4
Letters 6
Detroit Newsletter 10
Pipeline 14
European Newsletter 18
Technotes 19

W. Bradford Briggs
publisher

•

Editorial Staff

Karl E. Ludvigsen
editor

Warren Weith
managing

Stephen F. Wilder
road tests

Gene Butera
art

Jesse L. Alexander
europe

Herb Williamson
associate

Sondra Berkowitz
assistant

•

Contributing Editors

Griff Borgeson
Dennis May
G. P. Berk
Wayne Thoms
Steve McNamara

•

Staff Artists

C. O. LaTourette
Thomas E. Fornander

•

Advertising Staff

Robert E. Richer
national manager

William R. Burke
western manager

G. W. Fleming
eastern representative

D. A. Goodall
london representative

Irv Dolin's color shot of the Mike Garber Maserati Type 61 is featured on this month's Car and Driver cover. Driving is Gaston Andrey, while the circuit is Thompson Raceway. Occasion? C/D's track test appearing on page 27.

Member Audit Bureau of Circulations. BRANCH OFFICES: Midwestern Office, 434 South Wabash Avenue, Chicago 5, Illinois. Western Office, 9025 Wilshire Blvd., Beverly Hills, California. London Office, D. A. Goodall Ltd., 4 Old Burlington Street, London W.1. England.

ZIFF-DAVIS PUBLISHING COMPANY, One Park Avenue, New York 16, N. Y. William B. Ziff, Chairman of the Board (1946-1953); William Ziff, President; W. Bradford Briggs, Executive Vice President; Michael Michaelson, Vice President and Circulation Director; Hershel B. Sarbin, Vice President; Charles Housman, Financial Vice President; Richard Kislik, Treasurer.

CAR AND DRIVER is published monthly by the Ziff-Davis Publishing Company, William B. Ziff, Chairman of the Board (1946-1953), at 434 South Wabash Ave., Chicago 5, Ill. Second class postage paid at Chicago, Illinois and additional mailing offices. Authorized by Post Office Department, Ottawa, Canada, as second class matter.

SUBSCRIPTION RATES: One year, U. S. and Possessions and Canada $5.00; Pan American Union Countries $5.50; all other foreign countries $6.00.

SUBSCRIPTION SERVICE: All correspondence concerning subscriptions should be addressed to CAR AND DRIVER Circulation Dept. 434 South Wabash Ave., Chicago 5, Ill. Please allow at least four weeks for change of address. Include your old address as well as new—enclosing if possible an address label from a recent issue of this magazine.

CONTRIBUTIONS: Contributors are advised to retain a copy of their manuscripts and illustrations. Contributions should be mailed to the New York Editorial Office and must be accompanied by return postage. Contributions will be handled with reasonable care, but this magazine assumes no responsibility for their safety. Any copy accepted is subject to whatever adaptions and revisions are necessary to meet the requirements of this publication. Payment covers all author's, contributor's, and contestant's rights in and to the material accepted and will be made at our current rates upon acceptance. All photos and drawings will be considered as part of the material purchased.

Copyright © 1961 by Ziff-Davis Publishing Company. All rights reserved.

verly

; W.
sman,

South
da, as

Ave.,
om a

Office
copy
tor's,
art of

FALCON-ENGINE PUMPKIN SEED HITS 205.949 WITH AUTOLITE SPARK PLUGS

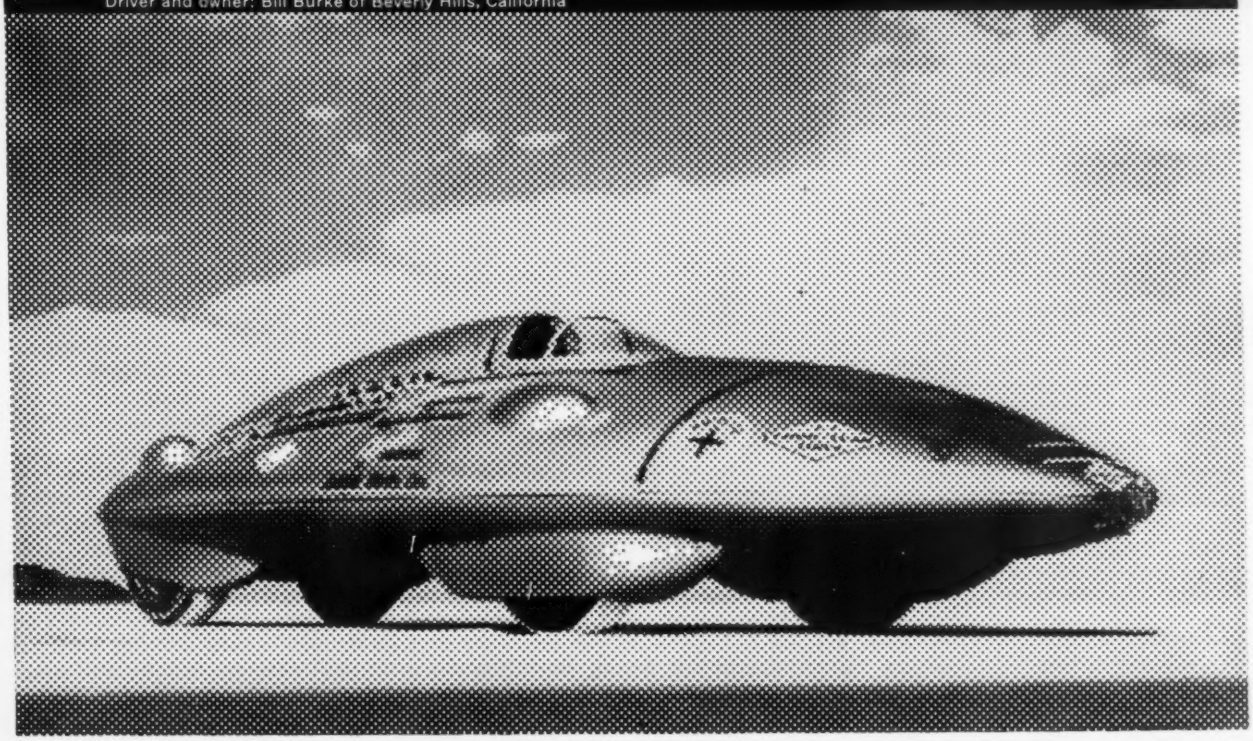
Pumpkin-seed-shaped SCI Special slices to Class D record of 205.949 miles per hour across the salt of Bonneville, smashing the ten-year-old mark by over 43 mph. The engine: a 156-cube Ford Falcon in-line six. The spark plugs: Autolite. Lesson for the day?

Makes no difference whether your car looks like a pumpkin seed or comes equipped with a Falcon engine, Autolite Spark Plugs can't be beat. There's a set made especially for the car you drive. As the pumpkin seed proves, you're always right with Autolite.

AUTOLITE

SPARK PLUG DIVISION • TOLEDO 1, OHIO

Driver and owner: Bill Burke of Beverly Hills, California



SENSATIONAL SOUNDS OF SPORTS CARS RACING!

Every enthusiast will want this superb 12", Hi-Fi, 33-RPM, long-playing album. Exclusive with Rosemont, its brilliant recordings capture the fantastic sounds of world-famous sports cars racing on the track. Undistorted clarity. Nerve-tingling realism. 36 full minutes of exciting sound! Compare this album with any other. You'll *hear* the difference!

Corvette, Triumph, A. H. Sprite, Porsche 1600, Ferrari Testa Rosa, MGA, Alfa, Jaguar, A. C. Bristol, Stanguellini F Jr., Porsche RSK—HEAR these fantastic cars screaming down long straightways, sweeping through fast bends, upshifting, downshifting and braking. Rosemont has purposely recorded only one car at a time! The results justify our trouble and expense. For the first time, you will hear the sharp, pure sound of each individual car, uncluttered by other noises — another exclusive with Rosemont.

To bring you the most faithful recordings ever achieved, Rosemont used the finest high fidelity recording equipment. Each record is pressed on pure, virgin vinyl. This Hi-Fi masterpiece will play with true-to-life brilliance on both regular and stereophonic record players.

WARNING: if you turn up the volume a little on your player, Rosemont will not be responsible for shattered windows.

ROSEMONT PRODUCTIONS
BOX 353, BRYN MAWR, PA.

ORDERS SHIPPED POSTPAID SAME DAY RECEIVED in sturdy, protective mailer. Fill in coupon and mail with check or money-order for the sound-thrill of a lifetime.

CLIP AND MAIL COUPON

Please rush ( ) new Rosemont LP Album(s).
I enclose $5.98 for each album ordered.
(Send cash, check or money order) No C.O.D.

Name_____

Address_____

City_____ State_____

ROSEMONT PRODUCTIONS

Box 353 Dept. 461 Bryn Mawr, Pa.

OBSERVATION AND OPINION

NEWS OF THE BETTER ENGINE— Though results from the hop-up shops like Dean Moon and Vic Edelbrock aren't in yet, Buick's gone ahead and introduced its own power kit for the little aluminum V8. Called Option Code W1 it delivers, installed on the engine at the factory, for a remarkably modest $33 surcharge. You get a new intake manifold carrying a four-barrel carb, enlarged exhaust ports, a compression ratio of 10.25 to one — requiring premium gas — and a new speedometer reading to 120 mph! Power is increased to a healthy 185 bhp, apparently without a corresponding increase in the rpm required. This is a bargain in power you can't beat anywhere.

MONZA ABSTAINERS—We received some criticism, postmarked entirely in England and Canada, of Jesse Alexander's report on the Monza G.P. in our January, 1961, issue. This was the race, you recall, which the British teams and drivers avoided because the Monza banking was used together with the road circuit, as in 1955 and 1956. Jesse felt their abstention was not in the spirit of motor racing nor sportsmanlike, and said so. In the same issue, though none of the letter-writers seemed to have read it, was comment by a man who should know, the winner of the condemned race, Phil Hill:

"Well, it isn't particularly a thing that I like to do [driving on the Monza banking], to be perfectly frank, but there's lots of stuff I don't like to do in motor racing. There are lots of stretches of road and places that I just don't like to negotiate. But I hardly think that because one feels this way a boycott is justified. Actually, I think the English were being a little bit hysterical about the whole thing . . .

"I'm sure that if I were driving a team where the cars had so little margin of strength that they had failures even on normal roads, I might be frightened to drive on the banking myself! But let's not forget that there were three weeks between Oporto and Monza — certainly enough time to do any additional gusseting or strengthening, *if* they hadn't decided long before that they weren't going to go."

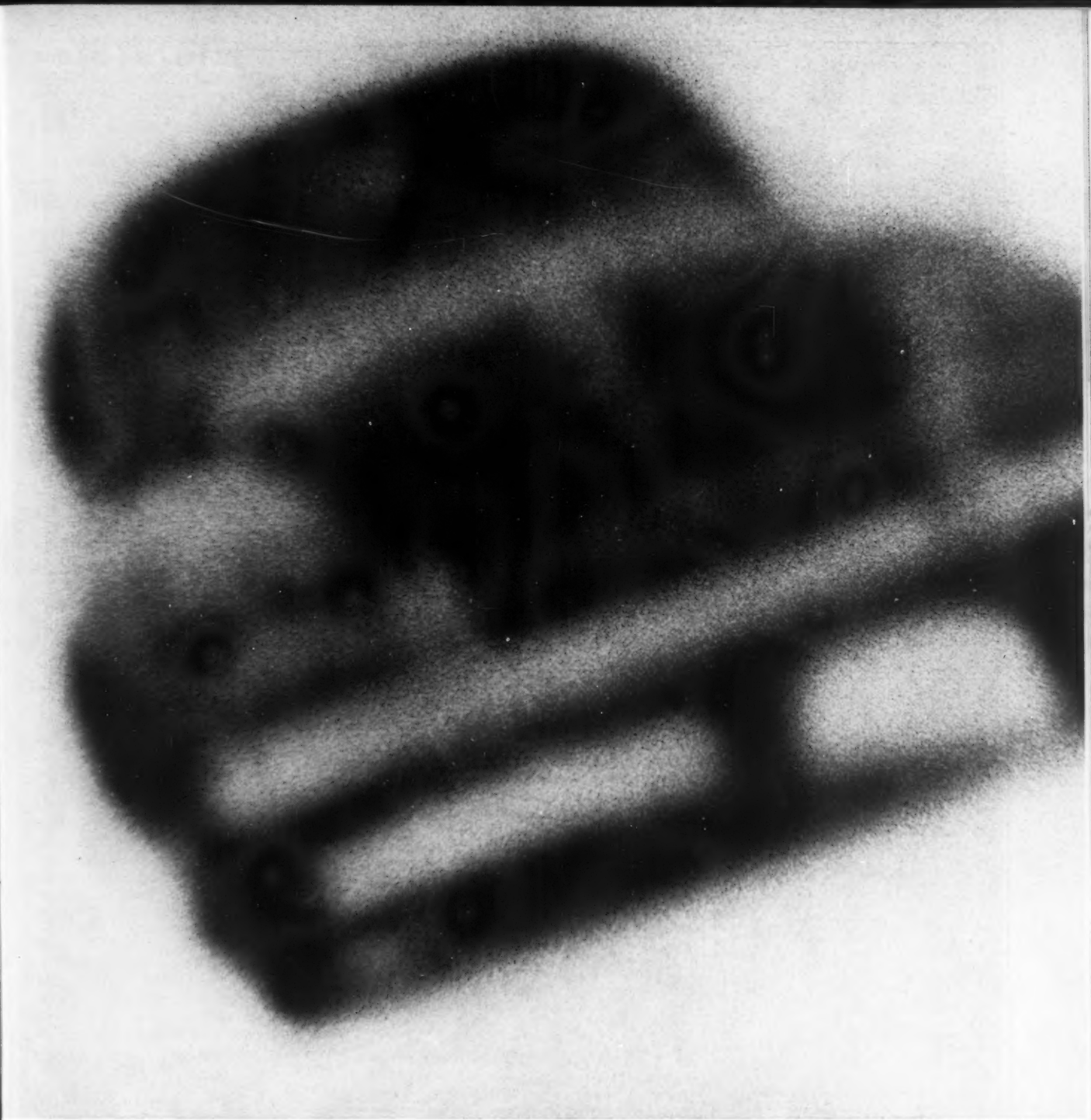
If it was not clear at the beginning of the 1960 season that the Monza banking would be used, then the British had a point. The season's schedule has a powerful influence (or should have) on the kind of car that's fielded by a manufacturer. Inclusion of a track like Monza could well act as a safeguard, as Phil hints, against excessively flimsy car construction, but it must be known well in advance.

Assuming it wasn't known at the beginning of the year, and that the British had legitimate grounds for objection, their negotations with the Italian organizers were anything but tactful. Their protest was not registered as such but rather as an ultimatum, that if the game weren't played their way they wouldn't play—highly reminiscent of their original high-handed attitude toward the 1½-liter G.P. Formula.

When the British were not near-certain winners in every Grand Prix, as when Tony Vandervell took his first Vanwalls to race on the Monza banking against the Mercedes team in 1955, it was a Good Thing — it was far more important to have taken part than to win. The British were highly sportsmanlike losers in those days; no ultimatums or recriminations then. Now that they're on top of racing, though, things have changed. Competing without a chance of winning appeals no longer. Even competing at all, where some extra effort of will or mechanism is demanded, has lost its challenge. Good losers the British were, but good winners they are not.

In good times and in bad (and Lord knows he has had enough of both) Enzo Ferrari has raced everywhere in every Formula. In 1960 he took his Formula 1 cars to England three times, to race on circuits unsuited to his cars in competitions he could not hope to win. It's conspicuous that Ferrari does all he can to bring about the selection of racing Formulas that suit his inclinations, then backs the chosen regulations with entries everywhere whether they're to his liking or not. Once decisions are made in open conference he doesn't fight them but gets on with the racing. Perhaps through decades of racing Ferrari has learned that he can draw from this great sport no more than he puts into it. Let's hope the British can learn to make their books balance as well.

—*Karl Ludvigsen*



*SUGGESTED RETAIL PRICE EAST COAST P.O.E. ©1961 BY VOLKSWAGEN OF AMERICA, INC.

The experimental X-93 Volkswagen.

You may think that when you've seen one Volkswagen you've seen them all.

But this one is different.

It has some features that may not show up on production models for a year or two.

Or ever.

If and when we add them, it will be only because they work perfectly, not because we have to meet a deadline.

For example: We developed a damper that took the last bit of vibration out of the steering wheel on rough roads. We added it in mid-year: March of 1960.

Often, one refinement leads to another.

We tested a new carburetor in North Sweden in 1959 and added a de-icer to go with it. They are both on the current VW.

You'll notice that these are not extra-cost options. They are part of the car and so included in the price: $1,565.*

What does the X-93 have?

Nothing earth-shaking.

Improvements that will make the VW even better. In performance. In reliability. In comfort.

And by the time they're on the car, there won't be a bug in them.

MARKEN. LTD

104 Islingword Road
BRIGHTON SUSSEX
ENGLAND

OFFICIAL FACTORY-ISSUED SHOP MANUALS FOR BRITISH AND EUROPEAN CARS

All these AUTHENTIC manuals are printed in English. We hold the largest stock in the U.K. British enthusiasts read our regular ads in all of the British Motoring Press. All prices include surface postage and packing to anywhere in the world.

Each manual averages 225 pages 10" x 8" and gives official and comprehensive step by step instructions for adjustment, complete overhaul and tuning fully illustrated with charts, blown diagrams and illustrations.

ALFA ROMEO Giuliettas	$16.50
ASTON MARTIN DB2, DB3	14.00
AUSTIN A30, A35 *	8.00
AUSTIN 850 *	8.00
AUSTIN all models state which *	8.00
AUSTIN HEALEY 100/4 *	8.00
AUSTIN HEALEY 100/6 and 3000 *	8.00
AUSTIN HEALEY Sprite *	8.00
BORGWARD Isabella	12.50
CITROEN 2 CV	14.00
CITROEN ID 19	14.00
CITROEN DS 19	14.00
COVENTRY CLIMAX 1100cc OHC engine	6.00
DKW (AUTO UNION) 3-6 Sonderclasse	19.00
FIAT 500 to 1955	10.00
FIAT 500 twin 1957 on	17.50
FIAT 1100, 1100-TV 1953-6	20.00
FIAT 1100, 1200 1957 on	17.50
FIAT 600	17.50
FIAT 1400, 1900	24.00
FIAT 1800, 2100	8.00
HILLMAN MINX all years, state which	8.50
JAGUAR V2½, 3½ litre	12.00
JAGUAR VII XK120 (OK XK140)	12.00
MERCEDES 300, 300S	27.50
MERCEDES 300 SL	30.00
METROPOLITAN all models *	8.00
MG TD, TF, TF 1500 *	8.00
MG MAGNETTE ZA, ZB *	8.00
MG MGA and 1600 *	8.00
MGA MAGNETTE III *	8.00
MG MGA Twin cam *	8.00
MG all models state which *	8.00
MORGAN all models	4.00
MORRIS Minor MM, II, 1000 *	8.00
MORRIS 850 *	8.00
MORRIS all models state which *	8.00
N.S.U. Prinz, Sport Prinz	15.50
PANHARD DYNA "Z"	15.00
PEUGEOT 403	11.50
PORSCHE 356-A, 1290-cc, 1582-cc	25.00
RENAULT 4 CV 750	8.50
RENAULT Dauphine	10.00
SIMCA Vedette	10.00
SUNBEAM RAPIER	12.00
SUNBEAM ALPINE	12.00
S.U. CARBURETTERS & FUEL PUMPS	4.00
TRIUMPH TR-2, TR-3	12.00
TRIUMPH HERALD	10.00
VOLVO all models, state which	14.50

* denotes that the Spares Listing (contains illustration and official part number of all parts) is available at the same price as the Manual. Special offer—set comprising Workshop Manual and Spares Listing for $15.00.

Our catalogue describing over 450 books on motors and motoring is now available, price 50 cents.

ORDERS: State your name and address also year, make and model of your car. Enclose your ordinary check in $ (or get an International Money Order from your Post Office) and send by airmail. We specialize in prompt service.
INQUIRIES: If your car is not listed above, airmail us a full description and we will quote by return airmail.

LETTERS

SEES STUDEBAKER SNUBBED

As a subscriber, long-time SCCA member and past R.E. of the South Bend Region, I have come to note something of interest, possibly only to those living in this community.

I have no bone to pick, nor any connection with Studebaker-Packard. I do not, I am sorry to say, even own a Lark. But why do you ignore them? I have noticed this several times, most recently in the February '61 Detroit Newsletter under "Compact Reception."

In my opinion, in the days since 1953 and 1954 these have come to be good cars and offer more range and variety than any one of the others. Certainly their originality must be commended and like so many, I'm for the "little guy." Perhaps that and my civic pride being ruffled has brought on this outburst.

Anyhow, keep up the good work with CAR AND DRIVER—but please keep us in mind here in South Bend.

Timothy T. Shugrue
South Bend, Indiana

EASY DOES IT, MASTEN

In 1952, as secretary of the SCCA Contest Board, I signed Masten Gregory's first competition license. The consensus of those who watched Masten's early races was, "*If he lives*, he'll be a great driver."

Well, it looks like he did and he is. I do wish he'd stop scaring all of us with his spectacular crashes, for anyone who knows him wants him to be with us for a long time. Congratulations for a fine article on a great driver and a fine fellow.

G. W. Fleming
Wilton, Connecticut

I enjoyed very much the article on Masten Gregory in the February issue. Reading this reminded me of an incident at a cocktail party in New York a week after the 1958 Sebring race.

A young man, obviously intending to impress his date, introduced her to "Masten Gregory, the famous race driver." Her response was to ask Masten, "What do you drive, midgets?"

While writing, I would like to take exception to your comments in the May, 1960 issue discouraging owner maintenance of Porsches. These cars are extremely easy to maintain. Anyone with a smattering of mechanical aptitude can do about anything short of disassembling the transmission. A 69-year-old friend of mine thinks nothing of having to disassemble his engine. Of course anyone his age who lubes his car while lying on his back on the garage floor is a real enthusiast.

Congratulations on a usually fine publication.

Mike Robbins
Indianapolis, Indiana

A BRAVO FOR BORGESON

I will waste no words. I wish to thank you most sincerely for the magnificent article "Borgeson at Bonneville" in the January issue.

Ever since Mickey Thompson started building his record car I've been starved for complete, accurate and truthful information as to what is going on on the salt. You have brought me up to date in full measure.

Harold Hart
Bay Shore, New York

MORE NEW BUGATTIS

In Ken Purdy's otherwise excellent treatment of the Type 46 Bugatti, there were a few small errors which several of my clients asked me to point out to you.

Both Type 101C Bugattis were imported by me. No one else participated. The Paris Show drophead was sold before arrival to Dr. Edwin Ruker, of Richmond, Virginia. The Van Antem coupe, tuned at Molsheim while I was there and modified slightly for my own use, had to be offered for sale after importation due to business commitments. With 2200 km registered at the time of importation, it could hardly be considered in the advanced stages of wear.

I am certain that at the time he wrote the article, Mr. Purdy was not aware that our European affiliate was in the process of assembling three Bugattis from new parts. The Type 64 sports and the two Type 73C monopostos have less than 10 km use combined and will be offered to known enthusiasts.

You might be interested in passing on a few bits of information on the Type 46. Although I derived great pleasure from my own Type 46 and still consider it the ideal fast tourer, the model was not well received. Apparently, the failure of the first few transaxles (rectified immediately at Bugatti's expense) gave the model an unfavorable name. Most of the chassis produced were stored in a defunct academy between Molsheim and Mutzig and, according to old hands at the works, taken from there to the Russian front during the Occupation. If any survive, the irony of one of the best luxury-performance machines produced by our society being used on a collective farm should provide a chuckle or two. Finally, the works assures me that stripped Type 46 Bugattis were raced, although they have been silent about where and when and with what degree of success.

Gene S. Cesari
Grand Prix Imports
Thetford, Vermont

The decision to call the Rheault Type 46 (SCI, December, 1960) "The Only New Bugatti" was that of the editors, not of Mr. Purdy. There are, of course, other unused Bugs.

THE BLUEBIRD DEBACLE

I read with interest Griff Borgeson's Bonneville story in the January issue. As an F.I.A. committee observer at the Bluebird and Challenger runs, I would like to add my comments to the speculation concerning the Bluebird crash.

Joe Petrali, USAC Chief Steward, and I were among the first persons at the scene. With English newsman Tommy Wisdom, we were the first to go back over the salt

(Continued on page 8)

DODGE

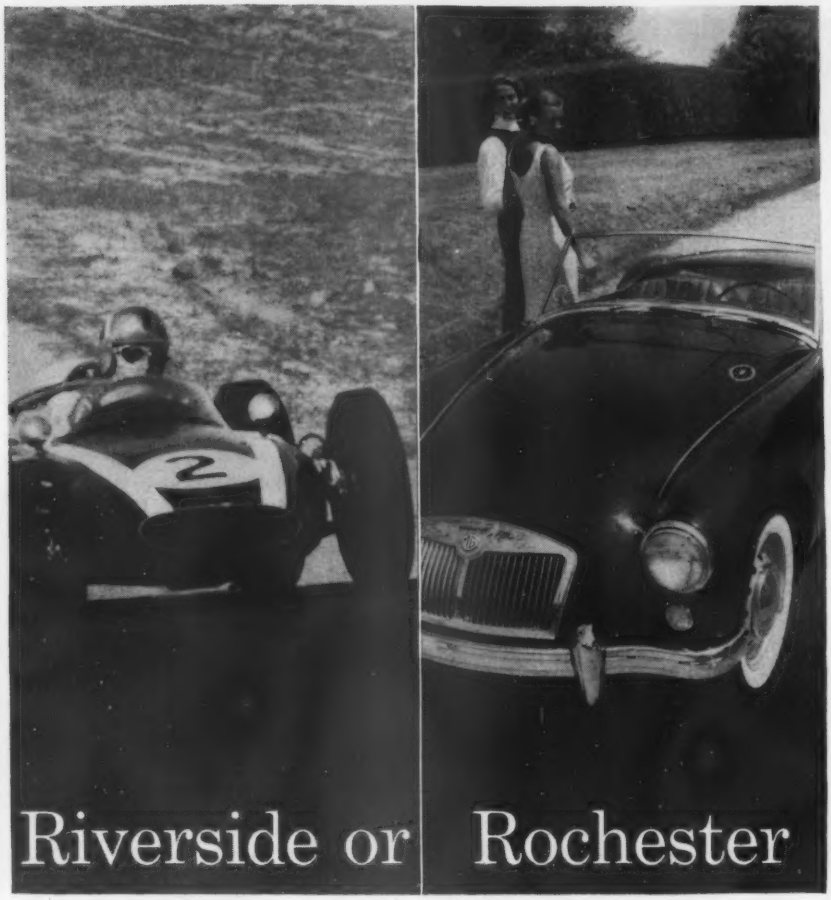
LANCER

THE MUSIC COMES OUT MIGHTY SWEET!

There's no whip, wooliness or waste motion in Lancer's manual transmission linkage. Every shift is short, crisp. An invitation to the gearbox virtuoso. Lay a hand on Lancer's seat-high stick. You'll feel like playing tunes again. And with Lancer's eager free-revving Charger 225 engine*, the music comes out mighty sweet. Or: lay a finger to Lancer's new pushbutton three-speed automatic transmission*. Entirely new in detail design, Lancer's lightweight automatic gives you smooth, quiet shifts. Excellent breakaway performance. Efficient operation, too. Enough of this—see your Dodge dealer. He has more good things to show you about Lancer.

*optional at modest cost

LOOK WHAT DODGE HAS DONE FOR LOW PRICE COMPACTS — LANCER



the right choice is Dunlop

When Stirling Moss won the 1960 United States Grand Prix at Riverside, California, he climaxed two straight years of International World's Championship Grand Prix triumphs for Dunlop tires. Dunlop tires carried 16 winners in 16 races in 1959 and 1960 — plus all 32 runner-up cars. Jack Brabham, World's Champion Driver both years also drove every race on Dunlop tires.

Dunlop's unparalleled racing record is more than a coincidence. It's proof of a great tire.

As more and more non-racing American drivers have swung to imported cars, more and more of these cars have been equipped with Dunlop tires. Dunlop tires now are specified as original equipment by the manufacturers of 32 of the 46 leading imported cars.

Dunlop's unequalled original equipment record is more than a coincidence. It's proof of a family of great tires.

With the men who know tires best the *first choice* is Dunlop. There is a Dunlop tire that is the *right choice* for every car that drives on an American highway. Try a set of Dunlop tires. You'll see.

DUNLOP
TIRE AND RUBBER CORPORATION
Buffalo 5, New York

(Continued from page 6)

foot by foot to the starting point, and then make measurements.

The tremendous acceleration was evident by the wheel tracks which showed Campbell had started his run on the south side of the black line but in a short distance had drifted to the other side with an evident attempt by Campbell to straighten the car, shifting the weight forcibly so the right wheels started to dig in and the left wheels lifted. At this point, the Bluebird "got sideways" but *did not flip.*

It developed lift and actually flew through the air sideways. This may be disputed but the fact remains that before the car left the ground, the left front wheel dug into the salt and blue paint was scraped from the underside of the nose.

The first impact point was 696 feet away when the right wheels were torn off and more blue paint was scraped from the underpan. It bounced three more times at intervals of about 25 feet, then a 50-footer and then a slide sideways for 140 feet to a stop. Other than the fact that the wheel pants flew off, there is no indication whatsoever that the car rolled in the air. This was borne out in later talks with Campbell whose only injury was sustained on that first impact when his head hit the side of the cockpit. It's interesting to note also that when the car finally stopped, Donald cut the switch on the still-running engine and was conscious when lifted out of the cockpit. On arrival at the hospital, he walked to his room.

William R. Tuthill
Museum of Speed
Daytona Beach, Florida

MORE MODEL CARS

Reading "Maserati for 69 Cents" in the December SCI revived some memories. When I picked up my first copy of SCI in 1955 at the age of 13, Maine was a part of the Great Sports Car Desert. I'd never seen a car like the flashing red one on the cover. Six issues and a lot of sports car lore later, I was a very frustrated kid. In an attempt to avoid my having a trauma, my father bought me a model kit of an MG TD. I went nuts. About a month ago, I acquired my first car — a '51 Morgan in very sad shape containing a very healthy '60 Triumph mill. It cost me everything but my subscription. Maybe in another 60 issues, even if you come out weekly (don't let this stop you!), I'll be as proud of it as Mr. Sandgren is of his beautiful machine.

However, I think the English "Merit" line of model cars should have been included. The cars include: Connaught G.P., B.R.M. G.P., Lotus Mk. XI, Alfa Type 158, Maserati 4CLT, Gordini G.P., Cooper Mk. IX, Talbot Lago G.P., '56 Maserati G.P., D-Type Jaguar, '55 Mercedes-Benz G.P., Vanwall G.P., Ferrari G.P. and Aston Martin DB3S.

Peter Gay
Plainfield, Vermont

A PENNY SAVED . . .

I would like you to thank Wolfgang von Braner for me. He saved me the difference between a Maserati and a VW. I can imagine that the saving would come very close to $10,000.

Frederick A. Gosch
Reading, Pennsylvania

Pick yourself a SUNBEAM and ride it to the sky!

Next time a Sunbeam Alpine streaks past you, imagine it's *you* behind the wheel. You're not operating a vehicle. You and your Sunbeam are one. Intimate. You play it, like an instrument. You glide through a lane as a sunbeam paints a meadow . . . streak down a road as a sunbeam spans a valley. You could do 100 mph, but even at forty you're flying! It's exhilarating just to *look* at your Alpine! Proud. Poised. Powerful. Yet it pampers you. With roll up windows. Seats you enjoy sitting in. An extra bit of room tucked away for when you need it. It's the lithest little temptress you ever fell in love with, and it's waiting to take you for a test spin now. Only $2595.00 P. O. E.*

* WESTERN STATES SLIGHTLY HIGHER

A BETTER BUY BECAUSE IT'S BETTER BUILT BY **ROOTES** MAKERS OF HILLMAN / SINGER / HUMBER / **SUNBEAM** Alpine

"Gus" Andrey took SCCA Championship and N. Y. Times "Driver of The Year" award for Class D Modified in 1960.

Andrey drove "Birdcage" Maserati to victory for Maser Racing Corp. Oilzum lubrication was part of its careful preparation.

GASTON ANDREY: Driver of the year ...OILZUM user for 7 years

There's no lubrication like Oilzum lubrication to help an able driver get the most out of his machine.

That's why "Gus" Andrey, a Saab dealer in Framingham, Mass., has used Oilzum motor oil, gear oil and greases for seven years—not only in competition cars, but in his family cars as well.

Get the most out of *your* cars with Oilzum – "The Winning Marque In Motor Oils!" The White & Bagley Co., 105 Foster Street, Worcester, Massachusetts, U. S. A.

DETROIT NEWSLETTER

by Roger Huntington

DETROIT RACERS

Detroit is sneaking back into stock-car racing, judging from the new generation of high-performance equipment that showed up at the recent Daytona Speed Weeks. Chevrolet has a new 409 cubic inch engine to compete with the latest 375 bhp Fords and 363 bhp Pontiacs. Dodge and Plymouth offer twice as many optional performance equipment combinations than they did last year, including the big 413 cubic inch Chrysler block in all models! And Oldsmobile is back with a complete line of "heavy-duty" engine and chassis equipment for all competition requirements. The now-famous Automobile Manufacturers Association's "anti-racing" decree of June, 1957 may have ended the high-pressure advertising and multi-million-dollar factory racing teams, but it certainly didn't stop performance development in factory engineering departments.

The new Chevrolet engine is a bored and stroked version of the present 348 cubic inch competition job. It uses the same big-valve heads, big-port intake manifold with huge Carter 4-barrel carb, the same cast "header"-type exhaust manifolds. But we now have a longer-duration cam, forged pistons, beefed-up pushrods and springs, and shorter rods to compensate for the stroke increase. The latter suggests that this block will later be used in trucks and standard cars.) They rate the combo at 360 bhp at 5800 rpm – and you're supposed to be able to order it off the assembly line by March.

Dodge and Plymouth are concentrating attention on carburetion options in conjunction with the 413 cubic inch Chrysler block (the 10-to-one heads and the hydraulic and solid-lifter cam kit options will be the same as last year). New "Sonoramic" manifolds are being made up with shorter passages that "tune" around 4400 rpm, instead of the 2800 rpm boost given by the 30-inch tubes last year. This will give a good boost in top-end horsepower for competition work, but still with pretty decent mid-range torque. The big block is rated at 375 bhp at 5000 rpm with this equipment. Speed enthusiasts with less money to spend can order a conventional dual 4-barrel manifold with "log" runners (no 180-degree routing) that will give the same bhp at 5200 rpm but with less torque. In addition all options are offered on the current 383 cubic inch block; top rating is 350 bhp. It is confidently intended that all this stuff can be ordered on any Dodge or Plymouth model off the assembly lines by April or May.

Olds hasn't come near the competition field since the A.M.A. ban. They were always very conservative about distributing the special stuff to the public anyway, preferring to reap any publicity advantages from racing victories in the hands of qualified professional race men. But they're in now, and they claim that the bulk of the new performance equipment will be available on any model off the assembly line "sometime in the spring". Details are scanty, but the engine equipment includes a bigger manifold and four-barrel carb, a hot cam with solid lifters, high-compression pistons, beautifully streamlined cast exhaust manifolds, and various heavy-duty internal parts. The chassis equipment includes special springs, shocks, roll bars, hubs, beefed-up axles, gears from 3.64 to 6.14 to one, etc. You can now assemble a 1961 Olds racing car from factory parts bins!

One trend should be pointed out about this new performance equipment: The idea is to make virtually everything available as optional equipment off the assembly line, so anybody can order it on any model. It wasn't always this way. In the wild days of the '56-'57 NASCAR circus, even the tech inspectors hardly knew what was stock and what wasn't. John Q. couldn't order a tenth of the available equipment on a factory-assembled car. But now, with performance advertising frowned on, Detroit must depend on drag strip victories in the hands of amateur speed mechanics for performance publicity. At the same time there is a growing awareness on the part of executives that super performance influences a growing market segment. Right now they won't admit to losing money on their few thousand "factory hot rods" produced each year, but they expect demand to grow in the future. Reputations built today will sell cars tomorrow.

BIG ALUMINUM ENGINES

The future of the aluminum engine around Detroit is somewhat clouded right now. It's one of those developments that seems bound to come eventually but nobody knows just when or *how*. Late word from the machine industry says tooling programs for big aluminum engines were canceled by Olds, Pontiac and Buick just last fall. These designs had been scheduled for the 1963 models. Meanwhile production problems plague the producers of the small Buick-Olds V8 and Corvair engines.

The big problem seems to be hard spots in the castings that break tools or wear them too fast, causing expensive "down time" on the machines. It seems to be caused by too sudden chilling of the molten aluminum in the water-cooled steel permanent molds. They can help the problem by pouring the metal slower or using less water cooling, but then they can't make the necessary production rate with the available casting machines. Casting cavities and porosity are also problems, and apparently due mostly to pouring rate. It's tough. American Motors and Chrysler aren't complaining with their high-pressure die-casting technique. But they may be having problems we don't know about. (GM's headaches always seem to leak out before

(Continued on page 12)

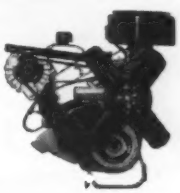
1961 Lancer

The best thing that ever happened to the 6-cylinder engine

When Chrysler Corporation developed the new Economy Slant Six Engine, they set it at a 30° angle for good reason—a bigger manifold system. This new design provides freer breathing, helps give you 20% more "go" on 15% less gas than our previous sixes.

A new, lightweight, 3-speed automatic transmission, the TorqueFlite Six, designed especially for the Economy Slant Six, gives the added pep of a torque converter, plus the smoothness and economy of a third forward speed.

This new engine and new transmission are available in Plymouth and Dodge Dart models, with smaller versions in the Valiant and Lancer. Let a drive bring out the difference great engineering makes.



The secret is in the slant
A 30° slant allows for a more efficient manifold. Helps this engine put out 20% more go than any six we had before, and on 15% less gas.

Chrysler Corporation

Serving America's new quest for quality

PLYMOUTH VALIANT • DODGE DART LANCER • CHRYSLER IMPERIAL

VOLVO! OWNERS!

now you too can

SUPERCHARGE WITH JUDSON

45% more horsepower at the rear wheels

Amazing acceleration

Surging passing ability

A higher cruising speed

Better control for safer driving

"It's amazing"—say leading sports car drivers

The Judson Supercharger provides more than just improved performance, it's a new experience that you get only from a good car that is properly supercharged. It's the "right" combination. Only with supercharging do you get such a "snap" in accelerating. Only with a supercharger do you get that feeling of flexibility and absolute control. It gives you rocket performance, a new thrill in motoring pleasure.

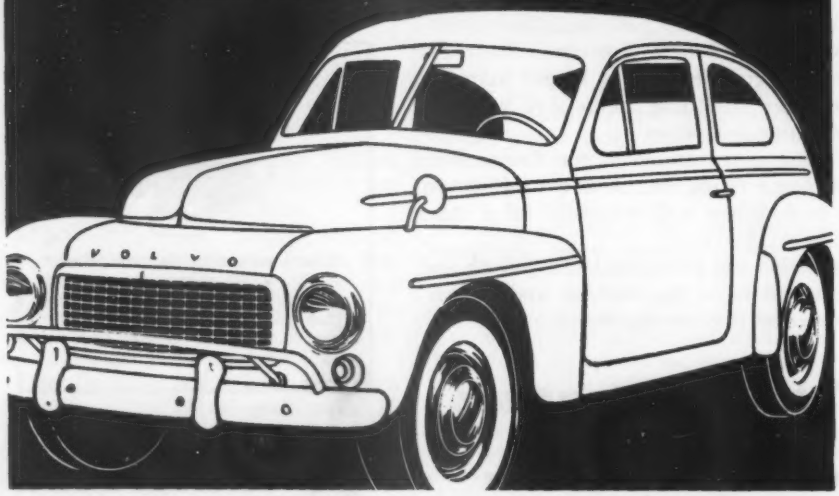
Get all the power out of your Volvo, power that you never realized was there, smooth surging power that is always available with a Judson supercharged engine.

Superchargers also available for the TR-3, 190 SL, MG-A, Volkswagen and VW-Ghia.

write today for literature

JUDSON

RESEARCH AND MFG. CO. CONSHOHOCKEN, PA.



(Continued from page 10)

anybody else's.) At any rate it's well-known that Doehler-Jarvis (who do the die-casting for A.M. and hold many important patents on the machines) are burning the midnight oil to find a practical way to die-cast cylinder heads with their necessarily intricate coring. With gravity-fed permanent-mold casting now in trouble, they stand to gain a lot. The head problem is the only thing holding them up.

While the aluminum casters moan, the machinists are having a ball. Many tool engineers feel we haven't yet scratched the surface in exploiting the soft aluminum's advantages in the areas of machining time and tool cost. They're learning new things every day. For instance, a copious flow of cutting oil is required in many cases, not to cool the cutting tool as with ferrous machining, but to wash away the soft chips which tend to cling. No telling where we may go eventually with aluminum machining. This may be the major area of economy with aluminum construction in the near future. Time will tell.

STUDEBAKER

A big question around Detroit these days is whether Studebaker-Packard's new president, Sherwood Egbert, can put the corporation back in the chips where it was ten years ago. The 40-year-old executive has five years of very successful work behind him as head of McCulloch Corp., the Los Angeles builder of chain saw, kart and outboard motors. He comes to S-P well recommended but he'll have his work cut out. S-P officers have recently canceled tooling orders for 1962 models pending decisions by the new management. Lark sales have been slipping for months, and Hawk sales haven't been a factor for years. It is now known the company was seriously considering a small four-cylinder, 95-inch wheelbase car in the VW class for possible '62 production. Everything is on the shelf now. There's money in the bank; not enough to do anything very important in the way of tooling, but too much to throw in the sponge. I wish I could be clever at this point and suggest a way out. But all I can think of is how glad I am to be an automotive writer instead!

While the auto sales outlook is at best murky at this writing, one person who should be in the know is predicting "Next year will be at least the second best for the U.S. auto industry." The speaker is none other than Carl H. Hahn, general manager of Volkswagen of America. He prognosticated a boom in U.S. export sales. While the total import sales figures were down in '60, VW was 39 percent ahead of its 1959 level.

SOME DAYS IT DOESN'T PAY ETC.

[From the Bridgeport (Connecticut) Post]

"Newtown — A 48-year-old Sandy Hook man escaped injury yesterday afternoon when his car skidded out of control and rolled over an embankment on Route 34 near Chestnut Hill road.

"After their accident, Resident State Police Sgt. James M. Costello arrested Victor Hinkel of Great Quarter road, driver of the auto, on a charge of driving" —*RH*

Ever drive behind a Porsche? **Whenever you do, you notice there's much more to a Porsche than its lithe, wind-sculptured styling. There's its superb roadability—as it maneuvers through traffic with a responsive agility to the wheel you can almost feel yourself. You admire, too, the stirring getaways and commanding sureness of its stopping power. Then you watch—as it soars out onto the open road—taking the sharpest curves and steepest hills in stride. Here's where you begin to fully sense the pure motoring pleasure Porsche owners enjoy mile after mile. Why not enjoy it too? Ask for a guest-drive soon—and discover for yourself why—"All it shares with other cars is the road." Porsche of America Corporation, 527 Madison Avenue, New York 22, N.Y.**

Dealers from coast to coast in the U. S. and Canada.

PORSCHE

DON'T BE MISLED!

THIS is the original "Mitten"

For nearly ten years, MG Mittens (registered) have been giving weather protection to thousands of sports and imported as well as domestic automobiles . . . saving owners hundreds of dollars. All of these tailored car covers have been sold under a MONEY BACK IF NOT SATISFIED GUARANTEE, the quality and workmanship have been constantly improved thanks to better technology and manufacturing processes. During that decade we, MG MITTEN, INC., have tried and rejected as unsuitable many, many fabrics and designs which have been brought to us or originated in our experiments to improve the product. Be assured that the MG Mitten is the **finest** and **most servicable** car cover, offering the best protection and the surest guarantee against harm that we can produce.

Do not be misled if someone offers you another car cover and refers to it as a "Mitten". Unless it is stamped with our trademark on the front it is NOT a Mitten and we can assume no responsibility for its quality or wearability. **Do not accept a substitute.** Remember, as the oldest and biggest supplier of tailored car covers, we have first choice of the latest and best in fabrics. Our lightweight canvas and DURICON, water repellent, materials represent the greatest quality at the lowest price.

Insist on an MG Mitten for 'Money-back' satisfaction.

MG Mitten

NOT GENUINE WITHOUT THIS STAMP

All MG Mittens are stamped on the front with our trademark. If it does not have this stamp, do not be misled. It is not a Mitten . . . the ORIGINAL tailored car cover.

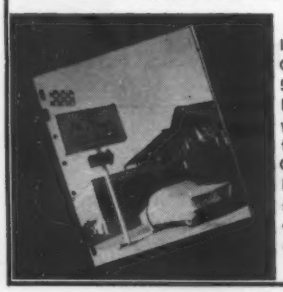
STORAGE BAG FREE!

Each MG Mitten is packed in a reusable heavy pliofilm bag, ideal for protecting the cover when not in use, fits into irregular storage spaces as a box cannot.

NEW LOW LOW MITTEN PRICES!

	Lightweight canvas Sun and dust cover	DURICON Water Repellent
MG Mitten Healey Hugger Triumph Tunic Alfa Apron (Spyder) Fiat Frock (500, 600, 1100, 1200 Rdstr.) AC Apron	**$16.95** **(Formerly $17.95)**	**$22.50** **(Formerly $24.50)**
Sunbeam (Alpine) Snood Jaguar Jacket (XK 120) Vest for Volkswagen Renault Romper Porsche Parka Alfa Apron (Coupe) Ghia Gown	**$21.95** **(Formerly $22.95)**	**$27.50** **(Formerly $29.50)**
Ferrari Frock Mercedes Muff (190-300SL, 220) Corvette/Corvair Cap Jaguar Jacket (XK 140, 150, 3.4)	**$26.95** **(Formerly $27.95)**	**$30.50** **(Formerly $32.50)**

If your car is not listed above, write for price. No obligation. Use the handy order blank.
Calif. residents please add 4% tax.



NEW SPRING CATALOG. Send 50¢ . . which will be refunded with your first order, for the new Spring Catalog of selected MG Mitten Accessories . . for the car, for the driver and just for fun. . .

To: MG MITTEN
Box 4156 Catalina Station
Pasadena 8, California MU 1-5681

I enclose $_____, please send me a _____ for my _____ (cover)

_____ (make) _____ (yr) _____ (model)

Name_____

Address_____

City_____ Zone___ State_____

PIPELINE

One hundred and ten miles west of New York City, as the honeymooners fly, is the Pocono Mountain resort area of Pennsylvania. Its bosky, rural charm may soon be shattered by the cacophony of racing exhausts if a dedicated group of enthusiasts has its way. They plan, simply, a $3 million to $4 million investment in a **top grade racing plant.** Toward this aim, racing and other authorities were assembled for a brainstorming session as plans entered the "pre-preliminary" stage.

The behind-the-scenes strategy sessions are rarely made public. You might find enlightening a rundown of what occurred. To begin with, **Racing Inc.,** the sponsoring body, was chartered in 1957, the outgrowth of an idea credited to Dave Montgomery, its youthful president. The corporation set up offices at 21 N. 7th St., Stroudsburg, Pennsylvania. It acquired options on 600 acres of slightly rolling countryside and began steps toward the sale of stock in the enterprise.

Before answering the possibly puzzling question of why this area was selected, it might be well to examine what is planned. According to Montgomery, the installation, which will accommodate everything from stock cars and karts to sports and G.P. cars, "must be a first-quality project or we're not interested." Planning talks have begun for providing for every necessity (and many "frills"). These include questions on banking. For example, should there be banking for sports cars, Indy cars, etc? If so, how much, how steep and the like. What grade asphalt should be used? What about drainage? The number of questions, answers and suggestions that may come up in such huddles is almost astronomical. One person presses for a separate entrance/exit for competitors. Others mention the need for covered pits (how many and what do you cover them with?). Are spectators to be permitted on top of the pits? Shall all (some?) pits be provided with gas, water and air? Another feels there should be provisions for drivers to be able to check items, facilities for them to shower and change after races, a place for all-night mechanics to grab some sleep.

At this writing, the ambitious Racing, Inc. plans are too nebulous for specific detail. Suffice to say the officers and organizers are aware of the problems of the physical racing needs and are weighing them in terms of desirability, need and fiscal expediency.

However, other items are also being considered. A specialist firm has been hired for designing spectators' facilities. The same firm, noted for its work in stadia, planned, for example, the plant at the U.S. Naval Academy. Talks have already begun with concessionnaires. Public relations networks have been strung.

Why locate in the Poconos? Racing, Inc. will build its track on **Rt. 115, five miles south of Blakeslee, Pennsylvania.** First, and perhaps most important, the area's businessmen and residents support the venture. Secondly, there are an estimated 25 million people, potential spectators, located within three hours of the site. Major highways run within a few miles of it: the northeast Pennsylvania Turnpike Extension, the Penn-Can highway and U.S. Route 80. Another was the relatively low cost of the land.

While it might appear at first that Racing, Inc. will be truly located in the boondocks, the fact that it is in the heart of a resort area supplies almost unlimited housing facilities. Still, Montgomery pointed out, plans include provisions for camping at the track.

An ambitious undertaking? Definitely yes. We'll watch with interest to see if Racing, Inc. can come up with a Grade A track. Certainly there exists a need for such a facility in the east, one that can accommodate all kinds of auto sport. If all goes according to the tentative timetable, first races, of a local, non-championship stature may be held later this year, though spokesmen for Racing, Inc. say they oppose opening the track until it's "completely" ready to go. . .

The Imp, a car trailer that will haul up to 500 pounds of cargo and quickly convert into an outboard motor boat is one item

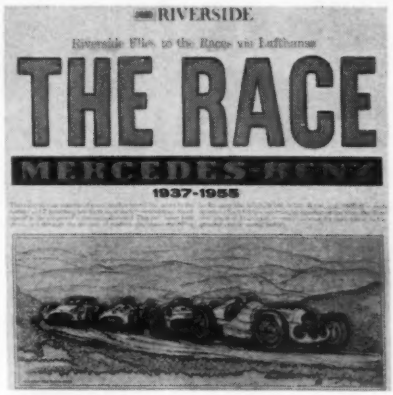
that struck our eye this month. Dry, it weighs 246 pounds and will take outboard motors in the 7½ to 12 hp range for speeds up to about 30 mph. Available in red, white or aqua, it's priced at $659 FOB Pak-Craft Co., Dept. C/D, 2774 E. Walnut St., Pasadena, California . . .

Reading the tea leaves . . . Look for the **'63 Corvette** to be six inches narrower and about a foot shorter than current types and to come as a roadster and a coupe. The

(Continued on page 16)

Two Fantastic new L.P. Recordings

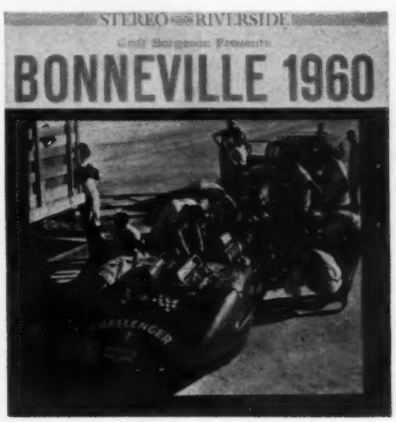
a buck a minute.....



RLP 5020 (mono) XK 8003 (stereo)

This exciting new recording contains only six minutes of sound, but without any question this is the most extraordinary sound ever put into the grooves of a phonograph record. In October of last year we flew to Stuttgart, Germany via Lufthansa and recorded all the cars in the Mercedes-Benz museum. There are dozens, and all the racing cars were taken out onto the test track and driven at speed by Karl Kling. They were recorded in all their uproarious sounds, and then through the miracle of modern electronic engineering, a race that never took place was created in which these seven cars (2 W125's, 1 W163, 1 W165, 2 W196's, and a 300 SLR) approach the starting grid, line up, rev, and then excitingly start. This is followed by lap on lap of tremendous racing sounds, shifting, braking for pit stops, and finally the finish of this special six minute classic. These cars have the most fantastic sounds ever produced by racing cars, and in fact, when we mastered our recordings two loudspeakers split in our studios as a result of the volume. These cars, of course, are the very ones driven by Fangio, Lang, Fagioli, Seaman, Caracciola, Von Brauchitsch, Moss, Collins, etc. $1.00 per minute may sound expensive, but these sounds are well worth the money. You high fidelity buffs will get a charge out of the stereo version because it is pressed on a very special new material which brings incredibly high responses (polymax), and the record starts at the centre and runs out in order to relieve centrifugal pressures on the grooves.

sounds on the salt flats....



RLP 5506 (mono) 95506 (stereo)

Griff Borgeson, contributing editor of Sports Cars Illustrated, has put together a remarkable record of the sounds emanating from the land speed record attempts this summer on the salt flats of Utah. Bonneville is the home of the Mickey Thompsons with their four-engined cars, as well as the people who like to put saddles on airplane jets and call them cars. In any case, every outlandish and wildly imaginative automotive device was out there this year shooting at the mark, and Griff and RIVERSIDE bring to you the beautiful noises they made. Included are such classic entries as the Brissette Brother 264 mph bell tank lakester, Dr. Ostich in his 267 mph Flying Caduceus, Art Arfons's Allison turbocharged, airplane-engined special, Bob Bowens' Shadoff Special at 273 mph, and last but not least, Mickey Thompson running at 406 mph.

RIVERSIDE RECORDS
235 West 46 Street
New York 36, N. Y.

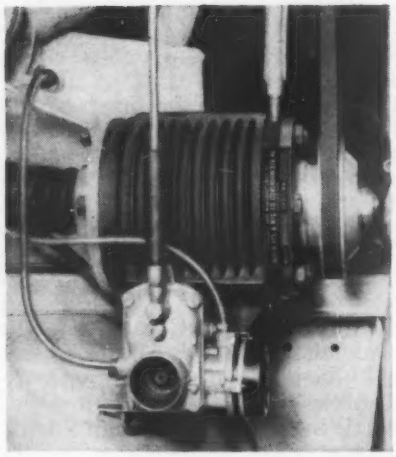
Please ship the following records postpaid. I enclose $_____.
I understand no C.O.D. ☐ 5020 ☐ XK8003 ☐ 5506 ☐ 95506
($5.98 each)

Name _____

Address _____

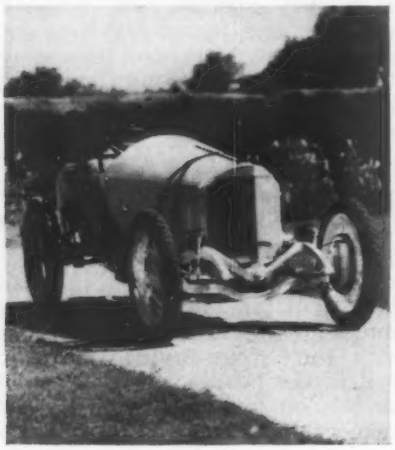
Test your sports car IQ!

QUICK QUIZ BY QUAKER STATE



1. What is the function of this equipment?

2. Where is this famous racetrack?



3. Can you name this old-time racer?

4. What does this symbol stand for?

THE symbol stands for years-ahead Quaker State Motor Oil. It's your car's best engine life preserver. Super-refined from pure Pennsylvania Grade Crude Oil to keep your car on the road, out of the repair shop. Insist on Quaker State—it's available most everywhere. For the name of your nearest dealer, call Western Union and ask for Operator 25.

Answers: 1. Supercharger, to give extra power. 2. Le Mans, France. 3. 1914 Mercedes Benz Grand Prix car. 4. World's finest motor oil.

Get your free copy of the new technical bulletin on British and European sports cars and passenger cars, prepared by Quaker State's Research Laboratories. Send your name and address, and ask for Bulletin P-952B-17.

QUAKER STATE OIL REFINING CORPORATION, OIL CITY, PENNSYLVANIA

(*Continued from page 15*)

coupe top will not be removable, but its fast-back will open up like the "trunk lid" on the Aston Martin DB2/4, that is, including the rear window. Sorry, our spy forgot to ask which end's got the engine.

Three-in-one. A wraparound headband with snap on sunglasses will make your wife's top-down junkets more comfortable. Known as **Jeepers Peepers,** the $4.98 unit

may be worn as a headband, a headband with sunglasses or as sunglasses alone. It's available with headbands in red, blue, brown, green, gray or cinnamon from Carol Westlake, Inc., Dept. S, 908 N.E. 8th Avenue, Fort Lauderdale, Florida.

The Sun Electric Corp., Dept. C/D, N. Avondale Ave., Chicago 31, Illinois is producing a 3 11/32-inch-diameter **electric tach.** Known as model FZ, the unit may be set into the dashboard or mounted in an adjustable bracket. It's available in **0 to 8000 and 0 to 10,000 rpm** ranges. If your car already has a tach and you are seeking extra points in concours competition, perhaps one way to do so would be to mount the unit under the hood where it would also be useful for tune-up work . . .

Sebring races for sports and Grand Touring cars are slated for March 25. The 11th annual event, the 12-hour grind will start at 10 a.m. on the 25th. On the 24th, there will be a bill of races including F. Jrs and other types of competition cars. Good news for the spectator is the announcement that admission prices have been reduced and that there will be no charge for practice sessions the immediately preceding Wednesday, Thursday and Friday. **Ticket information** is available from the Automobile Racing Club of Florida, Dept. C/D, Box 71, Sebring, Florida.

MOTORING SPECIALITIES for CAR and DRIVER

HAAN'S

RAYDYOT

FIA APPROVED BRITISH MADE

Racing Mirrors

$5.95 ea. ppd.

Used as original equipment by the leading racing car manufacturers including Aston-Martin, Cooper, Lotus, Vanwall, etc. Shatter-proof mirror in your choice of flat or convex glass mounted in streamlined spun aluminum cone housing. Wt. 5¾ oz. Adjustable base with positive locking device. Recommended for cowl mounting.

the Touch of Italy

Sala-Sport **DRIVING GLOVES**

Driving to work or play, you'll place these imported Italian Sala-Sport gloves with the exclusive non-slip grip among your choicest possessions. Skin-soft, well ventilated Italian leather, double leather palms. Select from four distinctive styles (except Shorties—$7.50) in all sizes. Your choice of all black, tan and natural brown, white leatherback and tan palm; knit back and brown palm. Shorties in knit back and brown palm only. Sizes: 6½-10 inclusive for ladies and gentlemen.

$7.95 ppd.

Sala-Sport

RACING & DRIVING SUITS

Designed in Italy with the sports car and racing enthusiast in mind, these original racing suits are colorful, comfortable and distinctive.

ONE-PIECE SUIT **$15.95 ppd.**

A European and American favorite for races and rallies. Features include elastic gathered wrists, waists and ankles; mandarin collar, roomy pockets with heavy duty zippers. Available in white, grey, French Racing Blue, Red or Black. Tailored washable poplin fabric in men's sizes only (36-38-40-42-44).

TWO-PIECE

RACING SUIT

(Pants $7.95 Jacket $9.95) **$16.95 ppd.**

FLAME PROOFING $1.50 per pkg. (add 25¢ postage). Flame proof your cotton, silk, linen or wool suit with "Official Flame-Proof Chemical's" No. 55. Spray or dip. Carries State Fire Marshal's approval.

NOW! NARDI STEERING WHEELS

These hand crafted steering wheels are the ultimate in foreign craftsmanship and workmanship. Specifically intended for the car owner who wishes to add charm and dignity to the appearance of his automobile.

Laminated select mahogany wood is finished to a richness and brilliance only obtained by endless hand rubbing. Duraluminum chromium plated spokes enhance and provide that finishing touch for a luxurious appearance.

Leading automobile manufacturers as well as champion drivers report Nardi wood rimmed wheel maintains high degree of safety and comfort.

Made to fit practically all makes of foreign cars. Enrico Nardi's signature is etched on the right spoke of every wheel produced as a guarantee of its origin.

From $70 to $95 ppd.

Exclusively Distributed in USA by Vilem B. Haan, Inc.

Fiat 1100, 1200; MGA, MG-TD/TF, Morgan	$70.00 ppd.
Fiat 1400, 1900; Lancia Appia, Aston Martin, AH 100/4, 100/6 (non-adj. boss), MG/TC	$80.00 ppd.
MB 190 SL, Porsche, Alfa Guilietta	$85.00 ppd.
Alfa Romeo 1000 and 2 LTR., Fiat 1800, Lancia Aurelia and Flaminia, AC, AH 100/4, 100/6 (adj. boss), Jaguar—All Models, TR III (non adj. boss), MB 220, 300 and 300 SLR	$90.00 ppd.
Mercedes Benz 300 SL	$95.00 ppd.

Available other models. When ordering state make, model and year of car.

SPORTS SPECTACULARS SUNGLASSES BY Robley OF FRANCE

"The Smartest Thing in Sight!"

"Sports Spectaculars" are custom crafted of Orama IV —World's only distortion-free streamlined, wrap-around organic glass. Daylight green lens. Featherweight and amazingly comfortable, this new lens, with its modern windshield look, is the finest ever produced. Comes in Continental Case. When ordering specify men's or women's style.

Another Haan Exclusive!

$12.95 ea. ppd.

NEW DESIGN

BELL "SHORTY"

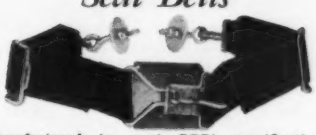
Crash Helmet

A new design for drivers who prefer the continental styling in their racing headgear. The "Shorty" incorporates the same energy-absorbing liner as the 500TX in a fiber glass shell of equal quality. Approved by Snell Fund Study. Meets all racing assn. requirements. Its genuine leather neck harness with nylon chin strap provides a glove-like fit and maximum security. Available in sizes 6¾ through 7¾. Both the snap-on and flip-up bubble shields may be used without alteration on this helmet.

"Shorty" with visor $36.50 ppd., less visor $35.00 ppd.
"500TX" Jet Helmet $38.50 ppd., less visor $37.00 ppd.

COMPETITION

Seat Belts



Manufactured to meet SCCA specifications. Identical to U. S. Air Force with exception of snap ends to slip into your eyebolts. Quick release buckle. All brand new nylon webbing and stitching. Available in black only. Belt width: 3".

$16.95 ppd.

Illustrated 52 Page Catalog

Profusely illustrated catalog containing hundreds of accessory items imported and domestic, representing our complete line. Catalog of automotive accessories for the foreign and sports car owner and enthusiast. 50c ppd. refundable on first order.

DEALERS INQUIRE

TO ORDER: Send check or money order. Enclose a minimum of 1/3 deposit for C.O.D. Calif. residents add 4% state tax. Full satisfaction guaranteed or your money cheerfully refunded. When applicable, state size, style, color, and 2nd choice if acceptable.

CUSTOMED FOR YOUR CAR

Custom Car Covers

Protect your car against dew, salt air, dust, etc. Specifically styled for individual make, model and year car. Cover is of sturdy silicone-treated fabric; vat-dyed, color-fast, washable, mildew and water repellent. Double pre-shrunk to retain appearance and proper fit. Elastic at both ends of car cover assures contoured fit.

State model, make and year car.

Alfa, AH, Sprite, Berkeley, Fiat Convertible, Metro, **$22.95 ppd.**

MG/TC-TD-TF-A, TR Ghia, Porsche, VW Corvette, Corvair, Fiat Sed., Falcon, T-Bird, Hillman, Jaguar XK-120-XK-140-XK-150, Mercedes, Morris, Opel, Renault, Sunbeam, Volvo. **$27.95 ppd.**

Ford Thunderbird, Chevrolet, Chrysler, Dodge, Plymouth, Pontiac, Studebaker, Buick, Cadillac, Lincoln, Mercury, Oldsmobile, Packard, Rambler, Willys, Kaiser, Hudson, Nash, Henry J. **$31.95 ppd.**

4-PANEL LENS • ITALIAN

Racing Goggles

Laminated shatterproof glass. Large conforming rubber face-pads with foam rubber lining for extreme comfort. Choice of clear or smoke colored lenses.

$11.95 ppd.

Specify Smoke or Clear Lenses

Vilem B. HAAN INCORPORATED

FOREIGN AND SPORTS CAR ACCESSORIES CENTER

10305-07 Santa Monica Boulevard

West Los Angeles 25, California

BRadshaw 2-4455 or CRestview 1-3775

Three blocks west of Beverly Hilton Hotel

Represented in Canada: Custom Sports Car Accessories, 40-42 Lombard St., Toronto 1, Ont.

EUROPEAN NEWSLETTER

It's practically impossible to get your Volkswagen serviced on short notice in Germany, so serious is the labor shortage. And anyone visiting the VW Wolfsburg factory, where output is approaching the 3800-per-day figure, can only gasp at the problem which some wags compare to India's concern over the birth rate. But VW will try to alleviate customer service worries by introducing a truly greased-for-life chassis when the new car comes out (some estimates hint at 1962) and whenever the car does appear, this one feature will undoubtedly be the most acclaimed.

European engineers are amused at the recent Ford claim of a greased-for-life chassis on the 1961 Fords and point out that these grease points are provided with a molydisulfide grease in a steel-on-steel joint but with a good seal. The joint is expected to be greased at 30,000 miles and a place for a nipple is fitted to each "lubrication-free" point. European as well as American manufacturers are seriously interested in a true lubrication-free chassis and are giving serious consideration to a Detroit development. American Metal Products "Fiberglide" uses Du Pont "Teflon" fiber woven into a cotton back-up material. It has been completely tested by Ford and if public acceptance of the current "greased for life" chassis seems to warrant, Fiberglide could be fitted to next year's models. On the continent a Bayer product called "Vulkollan" has been in use for some time now on several different makes of cars with quite good success. Vulkollan is of the polyurethane family and can do a good job under certain conditions but has limitations and does not replace all greasing points. For example, its suppliers do not recommend that it be used in the suspension or steering systems of fast sports cars as its characteristic softness does not provide good "feel of the road."

Wire services have already reported the sale of Volkswagen stock but it's interesting to note that employes of the factory may buy up to ten shares (they get one free from the factory) while other sales are limited to five. All of the 360 million shares put on the market will be sold only to people having incomes under $3900 a year. Control of the Volkswagen operations (four factories, 65,000 employes) will remain in the hands of the Federal German government. In 1961, Volkswagen will attain a total production figure of one million cars.

Perhaps it will come as a surprise that more of the world's best drivers come from the United States than any other country. There are 11 Americans on the list of 36 "Grade 1" drivers issued by the Commission Sportive Internationale of the F.I.A.

The Americans include Tony Bettenhausen, Don Branson, Richie Ginther, Paul Goldsmith, Masten Gregory, Dan Gurney, Phil Hill, Eddie Johnson, Jim Rathmann, Carroll Shelby and Rodger Ward.

From other countries, the list includes: Argentina, Juan Manuel Fangio, Carlos Menditeguy; Australia, Jack Brabham; Belgium, Paul Frere, Olivier Gendebien, Willy Mairesse; England, Cliff Allison, Tony Brooks, Jim Clark, Jack Fairman, Graham Hill, Roy Salvadori, Stirling Moss, John Surtees, Henry Taylor; France, Maurice Trintignant; Germany, Edgar Barth, Hans Herrmann, Wolfgang von Trips; Italy, Lucien Bianchi, Giulio Cabianca; New Zealand, Bruce McLaren; Scotland, Ron Flockhart, Innes Ireland and Sweden, Joakim Bonnier.

EXCITING SEASON

As the 1961 season gets underway, it looks like it will be a crowded and exciting one. Just take a look at the schedules! The Formula 1 calendar is as follows:

Monaco	May 14
Dutch	May 22
Belgian	June 18
French	July 2
British	July 15
German	Aug. 6
Italian	Sept. 10
United States	Nov. 26

Intercontinental Championship Races:

Silverstone	May 6
Brands Hatch	June 3
Indianapolis	June 25
Monza	June 29
Turin	Sept. 17
Watkins Glen	Oct. 8

Sports Car Championship Races:

Sebring	Mar. 24/25
Targa Florio	April 30
Nürburgring 1000 km	May 28
Le Mans	June 10/11
Pescara	Aug. 13

And these are just the racing features. In addition there's a full bill of championship hillclimbs and rallies.

European Championship Rallies include:

Geneva	April 19/23
Tulip	May 1/6
Acropolis	May 18/21
Mille Milles	May 27/28
Midnight Sun	June 12/17
Alpine	June 24/28
Polish	Aug. 1
Thousand Lakes	Aug. 18/20
Liege-Rome-Liege	Sept. 6/10
German	Sept. 27/Oct. 1
British	Nov. 12/18

Events counting toward the hillclimb crown include:

Rossfeld	June 8
Mont-Ventoux	June 25
Trento-Bodone	July 9
Freiburg	July 30
Klosters Davos	Aug. 27
Gaisburg	Sept. 10
Pontedecimo-Giovi	Sept. 17

As we said, it's an exciting season ahead, and you can count on CAR AND DRIVER for equally exciting coverage.

BRABHAM TO DRIVE COOPER IN INDY 500

A new dimension of spectator interest was added to the annual 500-miler at Indianapolis by the announcement that world champion Jack Brabham would challenge America's best on their home ground.

Brabham's mount will be, to no one's surprise, a Cooper. In October, the Australian recorded laps at over 144 mph in a 2½-liter Cooper of the same kind he used to win the title two years straight. For Indy, a suitably modified Cooper will be used. One of the interesting aspects of the Cooper entry is that the car will be rear-engined and have four-wheel independent suspension in the current road-racing mode. Just what giant-killing tactics the car might pull against the 4.2-liter Offenhausers remain to be seen, but if it should be successful or, for that matter, even demonstrate strong potential, there could be a mad dash when the checker falls as engineers and designers get back to the old drawing board. In addition to the modified car, a standby Cooper will be entered. Both cars are entered by "Gentleman Jim" Kimberly, a Chicago industrialist, and former SCCA champion. Harry Stephens, who was crew chief on the car Johnny Parsons drove to victory in 1950, has come out of retirement to manage the Cooper.

Testing of the Coopers at the Speedway will start early in May. Dunlop has been working on suitable tires. It was found the road-racing treads used in Jack's solo go at Indy would be too soft for actual racing. The story of the test venture was in the January SCI.

While Indianapolis is the only U.S. race the Kimberly Cooper will enter, something enthusiasts here may regret, Brabham himself is probably glad of it — as it is, he'll be commuting regularly across the Atlantic to prepare for Indy and compete in the Monaco and Dutch G.P.s! —*C/D*

COLTRIN

A prime example of European body-building art, the first Corvette Italia has been completed by Scaglietti, to whose 1958 Ferrari G.T.s it bears a family resemblance. This one was built for Gary Laughlin, of Fort Worth, Texas. Since the photograph was taken, the sleek two-seater has been fitted with wire wheels for even greater esthetic appeal. There are at least two more Italias in various stages of completion. One of these is destined for Texas driver Jim Hall. When, we wonder, will we see a "two-plus-two" Corvette, possibly along similar lines as these? It would be a beaut.

Glory road!

Climb into the businesslike bucket seat of a '61 Corvette. Feel the sensitive response to the steering wheel, the all-one-piece sensation of Corvette cornering, the pavement-charring acceleration. Obviously, glory roads are not limited to highways out of the dusty past, lined with crowds and scorched by colorful cars with historic names. They're every road and every street, anywhere you go in a Chevrolet Corvette. The great new shape of the '61 enfolds a deep-breathing V8 engine, available in every state of tune from smooth, dependable standard to a white-hot 315-horsepower Fuel Injection* version. These are a few of the facts-in-motion that'll make your dull roads glory roads. The instant you pop that lever into the first gear slot, Mister, you're going somewhere, and we mean *right now!*

Corvette by Chevrolet

Chevrolet Division of General Motors, Detroit 2, Michigan

*Optional at extra cos

Just Arrived

FOR THE **1961**

VOLKSWAGEN

MotoMeter

ALL-ELECTRIC

Fuel Gauge

NOW AVAILABLE for the '61 Volkswagen, this all-electric precision fuel gauge. Handsome, accurate, easy-to-read! Large illuminated dial, luminous pointer. Heavily chrome-plated bezel. Long-lasting polyethylene float will never corrode, assures years of trouble-free service. Simple, step-by-step instructions included. The easy way to keep an eye on the supply of fuel in your tank. Diameter, 1⅞" (40 mm.) *Model 40-B-61* **$17.95**

Also available, precision Fuel Gauge for 1960 and earlier VW's. *Model 1836/40* **$14.95**

Meet us at the Coliseum!
Booth 213, International Automobile Show
April 1-9

California Residents add 4% Sales Tax
New York City Residents add 3% Sales Tax

Write Today for FREE CATALOG! Order From Your Dealer, or

FISHER PRODUCTS 21-8 44th DRIVE • LONG ISLAND CITY 1, N. Y.
8836 A NATIONAL BLVD. • CULVER CITY, CALIF.

TECHNOTES

RETREADS

I have a 1958 Volvo, the best automobile I have owned to date. After 30,000 miles it is ready for new tires. What is the best American-made tire for this car and how would it compare with Pirelli Cinturato or Michelin X? Of course, I don't race my car, but I want excellent traction in wet weather along with long life, 30,000 or better. Present tires are Swedish Goodrich which are very poor in the wet.

What about recapping? My tires' sidewalls are in excellent shape, no bruises, cracks or scrapes. Is it possible to recap with rubber which will give better wet-weather traction? I've been told that recaps aren't safe above 55 and 60 and that they can't be properly balanced. Is this true? I usually cruise at 60 mph on long trips.

Secondly, is there any special tuning involved when an Abarth muffler is installed? I have one on my Volvo now and mileage has increased from 26.1 mpg to 27.3 which is not much. Neither is the reduction in 0-60 time, 14.9 to 13.6 seconds.

Ralph E. Parrilli
Paterson, New Jersey

In American tires, you pretty much get what you pay for. Cheap tires are good for low-speed use and premium ones for high-speed turnpike traveling. The middle-range, so-called "first-line" tires are a compromise, probably quite adequate for the 60-mph cruising which you do. Other than racing tires, nothing will touch the tires you mention except the Dunlop Duraband.

Your tires sound perfect for retreading. You needn't worry about speed, just pick a reputable retreader. Remember, most dragsters and many road-racing sports cars run retreads, the former up to three miles a minute! By changing compounds, the retreader can improve wet-weather traction but only at the cost of shortening tread life somewhat. Certain tread patterns can help too. Discuss this with the retreader.

Special mufflers are no longer the magic cure-all to acceleration and mileage that they once were. Yours are both better than before, by a margin which is about par for such a highly tuned sedan as the Volvo. Careful tuning (ignition, valves and carburetion) will always be the best means of improving performance without losing tractability.

SUPERCHARGED SPRITES

I am very much pleased with my Sprite but find something lacking when it comes to acceleration. At the Westhampton drag strip my best time is 64 mph in the quarter-mile. Before I lash out and buy a supercharger, I would like to know a few things. Will a supercharger stress my engine unduly? Will there be abnormal wear? Is it much work to install one? (If not, and if yes to the previous questions, I would

like to remove the blower except when I go to the drags.) Must anything else be done when one is installed such as resetting the timing or changing to colder spark plugs?

David Van Weele
Oakdale, L. I., N. Y.

Well, as even a casual reading of our RRR on the Sprite (pages 58-63) indicates, it's hardly a fire-breathing dragon. To tilt it in that direction, a supercharger has much to recommend itself in place of an extensive hopping-up. For one thing, there's only one thing to buy. It can readily be taken off when you want to sell or trade your car, though it's hardly the sort of thing you want to do twice a weekend.

A blower, as I'm sure you know, works by blowing more air into the cylinders than atmospheric pressure does by itself. The greater amount of air picks up more gasoline and when it all burns, there is more power. At full throttle, that is. More power means greater loads so naturally there is apt to be more wear while the stresses will certainly be higher. However, you needn't worry about undoing the blower after the drags are over; all you have to do is tie some feathers to your right foot until the next weekend. As long as you do not exceed the recommended rev limits (6000 rpm in the Sprite's case), the increase in wear and tear should be negligible.

There are two blower installations you should consider. One is offered by Judson Superchargers in Conshohocken, Pennsylvania who are well-known for their VW kits. The other firm to write to is Shorrock Superchargers Ltd., Church St., Wednesbury, Staffs., England. They made the blower on the Sprite Streamliner that Gus Ehrman drove 146.95 mph at Bonneville in '59. If you lived in England, you'd be able to buy a Shorrock-supercharged Sprite from your dealer, complete with a guarantee, though it wouldn't go that fast! With 25 more horses, it should knock two seconds off your e. t. and get you through at 70-plus. Living here in the States, you can only get the blower, not the guarantee. Write either firm for full information. They will tell you what plugs, spark advance and S. U. needles to use, all of which will likely be different from stock.

QUICKER CORVAIR STEERING?

I have just bought a Corvair Monza with the 98 bhp engine and the four-speed box. I find the steering very disappointing. For a 39-foot turning circle, 5-plus turns lock to lock is too much. Is there anything I can do to reduce either one of these?

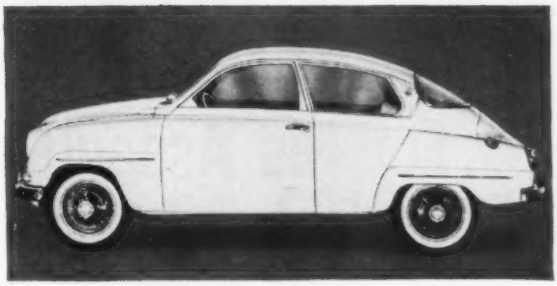
Leon B. Friedman
Chicago, Illinois

This isn't an easy one. Unlike the Corvettes, which use center-point steering, the Corvairs, and all other Chevys for that matter, use the relay set-up with equal-length tie rods and a dummy drag link (called the idler arm) which is symmetrical to the real drag link. Now, normally you can speed up the steering by lengthening the drag arms (or shortening the steering arms off the stub axle). But on the Corvair, with all the arms lying ahead of the axle line, there isn't room for more than about

(Continued on page 22)

A letter to the motoring public about a remarkable new car

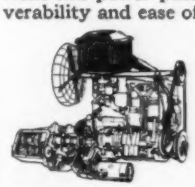
designed for Americans by Sweden's leading builder of jet aircraft



Dear Motorist:

Four years ago, SAAB of Sweden introduced the Saab automobile in the United States. Built by one of Europe's leading producers of jet aircraft, the Saab presented an entirely new automotive concept to American motorists. But it was a concept that had already been proved over hundreds of millions of miles throughout Europe. Americans took to the Saab with enthusiasm. Here was a car that combined beauty, economy, safety and comfort with the precision craftsmanship of aircraft engineering.

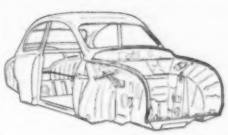
Most notable of Saab's many unique features is its front wheel drive, developed and perfected more than ten years ago. By combining the engine, gear box and differential in a compact front-end power pack, Saab offers exceptional traction, maneuverability and ease of handling—even in mud, snow and sand.



Another significant feature is Saab's highly efficient dual-stroke engine. With no valves, no cams, no tappets; the engine has only seven basic moving parts. Three cylinders do the work of six—with the same smooth power flow. Saab owners often travel more than 100,000 miles without an engine overhaul.

Saab is a beautiful car. But its sleek body lines are as functional as they are handsome. The design was actually developed in a wind tunnel to minimize wind resistance and air drag. As a result, Saab's ride is amazingly smooth, quiet and stable—even at high speeds. Another advantage of the car's aerodynamic design is remarkable fuel economy which averages 33-38 miles per gallon.

An authoritative automotive magazine recently referred to Saab as the "safest small car in the world." Here again Saab's aircraft experience was of prime importance, for the car was actually subjected to stress tests in much the same manner as airplane construction is tested. Saab's body shell is an armored fuselage of heavy gauge steel, welded and reinforced for tremendous strength and solidity.



Saab is unique among cars. Its compact exterior dimensions belie its interior spaciousness. Compared with other imported cars Saab offers more leg room, more head room and much more luggage space for greater driving comfort. The special convertible seating transforms the car at will into a utility wagon for big loads or a camping unit to sleep two. Although it consistently wins sports car rallies and competitions—often against larger, more powerful cars—Saab is very much a family car. It is nimble in traffic, easy to park.

Under Saab's sound marketing policy, fine dealer service is assured through regional depots with complete supplies of spare parts promptly available. Furthermore, all Saab parts are in standard American S.A.E. tool sizes. Any service man can work on a Saab.

In the four years Saab has been in the United States, we have made over 30 improvements in comfort and performance to meet American preferences. Yet there have been no changes in Saab's basic and proven design. Unlike many domestic cars which undergo yearly changes for change sake only, Saab retains its smartness and value for years. We do not build in obsolescence; we build in quality.

We firmly believe the 1961 SAAB 5-seater Sports Sedan and 7-pass. Station Wagon to be the finest automobiles ever produced for the money. They incorporate many important advancements—at no increase in price.

May I suggest you visit your nearest Saab dealer and let him show you the unusual features of this remarkable automobile. Then test-drive and compare the '61 SAAB for yourself!

Ralph T. Millet, President
Saab Motors Inc.

SAAB SWEDEN

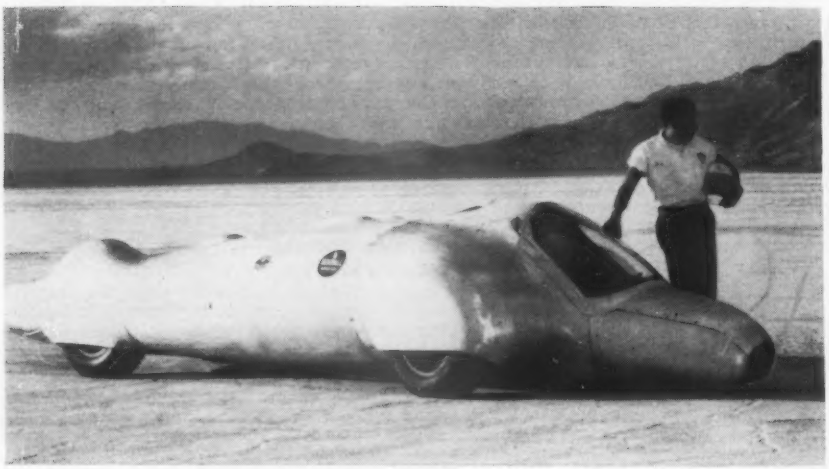
P.S. The 1961 SAAB is definitely competitive in price with cars selling at $1600 because its complete price of $1895* includes special equipment and features not found in other cars. 7343

Executive Offices: Saab Motors Inc., 405 Park Avenue, New York 22, N. Y.

EUROPEAN DELIVERIES ALSO AVAILABLE

*Suggested price, 5-pass. sedan, East Coast P.O.E. (white walls extra)

Art Arfons Selected KENDALL LUBRICANTS For His Assault on the World's Land Speed Record



When Art Arfons assaulted the World's Speed Record last year, his Green Monster was lubricated, from its 12 cylinder Allison engine to its twin differentials, with Kendall lubricants. Clutch difficulties prevented a new record, but Art will be back on the Salt Flats again this year.

His confidence in Kendall quality, specially formulated from the cream of Pennsylvania crude oil, is shared by competition and non-competition drivers the world over.

KENDALL DUAL ACTION
with special detergent additives for cleaner engine performance in competition, sports and road cars.

KENDALL NON-DETERGENT
recommended for all engines whose makers specify a detergent-free oil.

Selected the Official Oils for All Watkins Glen Races

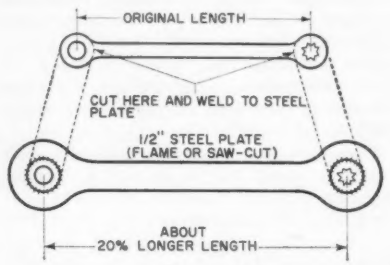
Ask your favorite dealer for them

KENDALL REFINING COMPANY · BRADFORD, PENNA.

(Continued from page 20)

20% change. If scrounging around the junk yards doesn't unearth suitable parts (if you find 'em, let us know what they're off of, and be sure to Magnaflux them), there is a reliable way of making your own, though you may not think it worth the trouble. Out of half-inch steel plate, flame-cut a dog-bone shape about four inches longer than the originals. Torch a hole in each end so that it now looks like a horribly cheap open-end wrench. Now, irrevocable step, hacksaw off the two ends of the original drag links and weld these doughnuts into the holes in the steel plate, being sure to keep them reasonably parallel. Now trim off some of the excess material to make the whole job look neater. After installing them (you'll have to make one for the idler arm as well, with the same increase), correct the toe-in and you'll be set.

Those "doughnuts" cannot and must not be fitted to a longer drag link by butt or lap-welding. By using the method described, the weld is relieved of all bending stresses and carries only compression, tension, and, (at the splined end) shear.



VOLVO 3- AND 4-SPEED BOXES

In your February issue you state, "To make a four-speed out of your current three-speed Volvo box you need only change five parts, add seven, and throw away two." If a 1958 PV444 can be considered current, please, oh please, advise me as to how this may be done and what twelve parts are needed.

Richard Muzinich
San Francisco, Calif.

Sorry, the 1958 isn't current in this context. The "convertible" three-speeders are only now emerging from the Volvo factory.

A. C.—CHEVY?

I am installing a Chevrolet engine of about 350 bhp in a '57 A. C. Ace Bristol, together with a Chevy four-speed transmission. Is it wishful thinking to consider hooking this to the stock rear end?

Frank Ball
New Haven, Conn.

Although the example is unusual, this is typical of much of our mail. Here's how you can figure them for yourself. First, remember it's torque that breaks off gear teeth, not horsepower as such. The Bristol engine's peak torque is about 162 lb-ft and first gear multiplication is 2.90. Drive-shaft torque is then 470 lb-ft maximum. I don't know just what the torque of your Chevy will be, but we won't be far wrong to use the 295 lb-ft figure of the stock fuel injection outfit. Chevy's first gear multiplication is 2.20 and driveshaft torque is 650 lb-ft, about 40% higher. This should be well within the margin of safety of the

(Continued on page 24)

Approach a pinnacle of perfection with Mercedes-Benz. The engineering and construction of Mercedes-Benz is aimed at perfection. This 300 SL for example, starts its life as an entirely hand-built spaceframe. Its tubes are cut, balanced and welded by devoted craftsmen. Its brakes and wheels are added carefully. Then its hand-welded body slips firmly over the geometric symmetry of its skeleton. Finally, its fuel-injection power plant, fresh from its test bench, is lowered into place. Then the 300 SL is road tested and checked with a thoroughness that leaves no secrets. Here, on the pavée of the Grossglockner high in the Austrian Alps, a joyful owner scorches through the mountains with the confidence only Mercedes-Benz can engender. Every Mercedes-Benz is a pinnacle of design and engineering so harmoniously blended that every drive is a refreshing and wonderful experience.

Mercedes-Benz cars include sedans, convertibles and sports cars. Prices range from about $3,300 to $13,000. Ask your Mercedes-Benz dealer for a demonstration. European delivery arranged by your Mercedes-Benz dealer at overseas prices. **Mercedes-Benz Sales, Inc.** *(A Subsidiary of Studebaker-Packard Corporation)*

CONSIDER THE SIMCA.

HERE'S ONE ECONOMY IMPORT THAT MAKES NO SACRIFICE IN QUALITY. SIMCA IS MORE LUXURIOUS, MORE SPIRITED THAN THE OTHER ECONOMY IMPORTS IN ITS PRICE CLASS. SIMCA IS THE ROOMY 4-DOOR SEDAN THAT SEATS FIVE IN REMARKABLE COMFORT AND LUGS THEIR LUGGAGE AS WELL. ECONOMY, QUALITY, COMFORT, PERFORMANCE: GET THEM ALL WITH SIMCA—THE IMPORT BUILT FOR KEEPS.

PARTS AND SERVICE COAST TO COAST. SEE YOUR DEALER NOW. **SIMCA** IMPORTED BY **CHRYSLER**

(Continued from page 22)

E.N.V. final drive unit and also the U-joints and driveshafts. But if you expect this isn't so (we've no experience or records of the A.C.'s rear end being fragile, but then we don't own one), you will be perfectly safe if you just never use first gear. Why? Because second gear (1.66) with the Chev set-up gives only 472 lb-ft.

The fly in this fast-accelerating ointment is this: Your top gear torque is up 82% and every time you mash down (which will be often, no doubt) you can expect that much more wear and tear. Undoubtedly the unit won't last as long, but we highly doubt that you would actually strip the gears first time out. Another point to keep in mind is that, with independent rear suspension, the Chevy's extra torque is all going to get on the road, since the inside rear wheel won't be so prone to lift. Ergo, still more wear and tear. But don't despair, there's brightness too. The E. N. V. unit has several optional ratios: 3.2, 3.36, 3.64, 3.91 (usually stock), and 4.3 to one.

BUICK-HEALEY

I'm thinking of putting a Buick Special aluminum V8 engine in my '56 Austin-Healey, together with a Corvette 4-speed box. What rear end ratio should I change to? Will stronger rear springs or Traction Masters be required? Is there an overdrive I can adapt to the Corvette box?

Michael Jordan
Orange, New Jersey

Sounds like a great idea. Read Gearing For Go in SCI, Nov., '59 for some answers to your first question. If you intend this car for combined drag and road use, either of the standard ratios (3.55 or, with overdrive, 3.91) would seem usable. The Buick's peak comes at 4600, not far from the Healey's 4750 while putting out 50 more bhp before you even start modifying (assuming of course that you get the Special WITH *the power pack). Unless you desire only turnpike cruising, forget the overdrive.*

Your second idea is on the right track but here's an approach that might save some money. First look underneath a late-model Corvette to see how they installed their radius rods above the leaf springs. Then go to a junk yard, buy some old tie-rods that have smooth action in their ball-joints. Also buy the drag links and steering arms that go with them. Go home and shorten the tie-rods "enough," then weld the stubs of drag links or steering arms to the frame and axle casing and, hey — presto, you've got some trailing radius rods, just like a Ferrari. A tip: if in their static position they trail upwards to the rear, this will provide roll-induced understeer effect; if downwards, oversteer effect.

. . . . . WHERE WE CAME IN

After reading the Roarin' Renault, I've decided to fix up my '54 VW with a V8 engine. I would like to know how to put the larger engine in my car. If you would send me some information, it would be appreciated. Thank you.

Bernard A. Eastep
Milford, Mich.

Somehow this seems like where we came in, but you might find the story "Violent VW" in our January, '58 issue of interest, if not of real help.

MORRIS

Austin-Healey

Every one of these fine cars

SINGER

English FORD

FIAT

comes to you Lucas equipped.

AUSTIN

Ferrari

For peak performance for

ROVER

Vauxhall

CITROËN

the life of your car always

SIMCA

replace Lucas with Lucas.

United States Factory Branches

LUCAS ELECTRICAL SERVICES, INC.

501-509 West 42nd Street, New York 36, N. Y.

Englewood, N. J. • Chicago • Houston • Los Angeles • San Francisco • Jacksonville • Seattle • Boston • Denver

LAMPS · DISTRIBUTORS · GENERATORS
COILS · HORNS · REGULATORS · STARTERS
WINDSHIELD WIPERS · GIRLING BRAKES
BATTERIES · GIRLING SHOCK ABSORBERS

PIRELLI means tires. A complete range of specialized tire types in sizes to fit all European and most domestic passenger cars.

Pirelli does not make any so-called second or third line tires. Each of its tire products is the realization of a complete concept of performance, whether it be the kind of traction that gives lightweight cars a solid grip on the road — or the speed-plus-safety formula that expert drivers have come to depend upon in "slides" and "drifts." In every case it is the specific car and driving pattern that should determine the proper tire equipment.

Your Pirelli dealer is a tire expert — a man who will be glad to help you work out a tire prescription that's right for your car. He can tell you about Rolle, Stelvio, Cinturato, Inverno, Supersport and how each of these tires differs in rubber compounds, casing construction, tread pattern and performance characteristics.

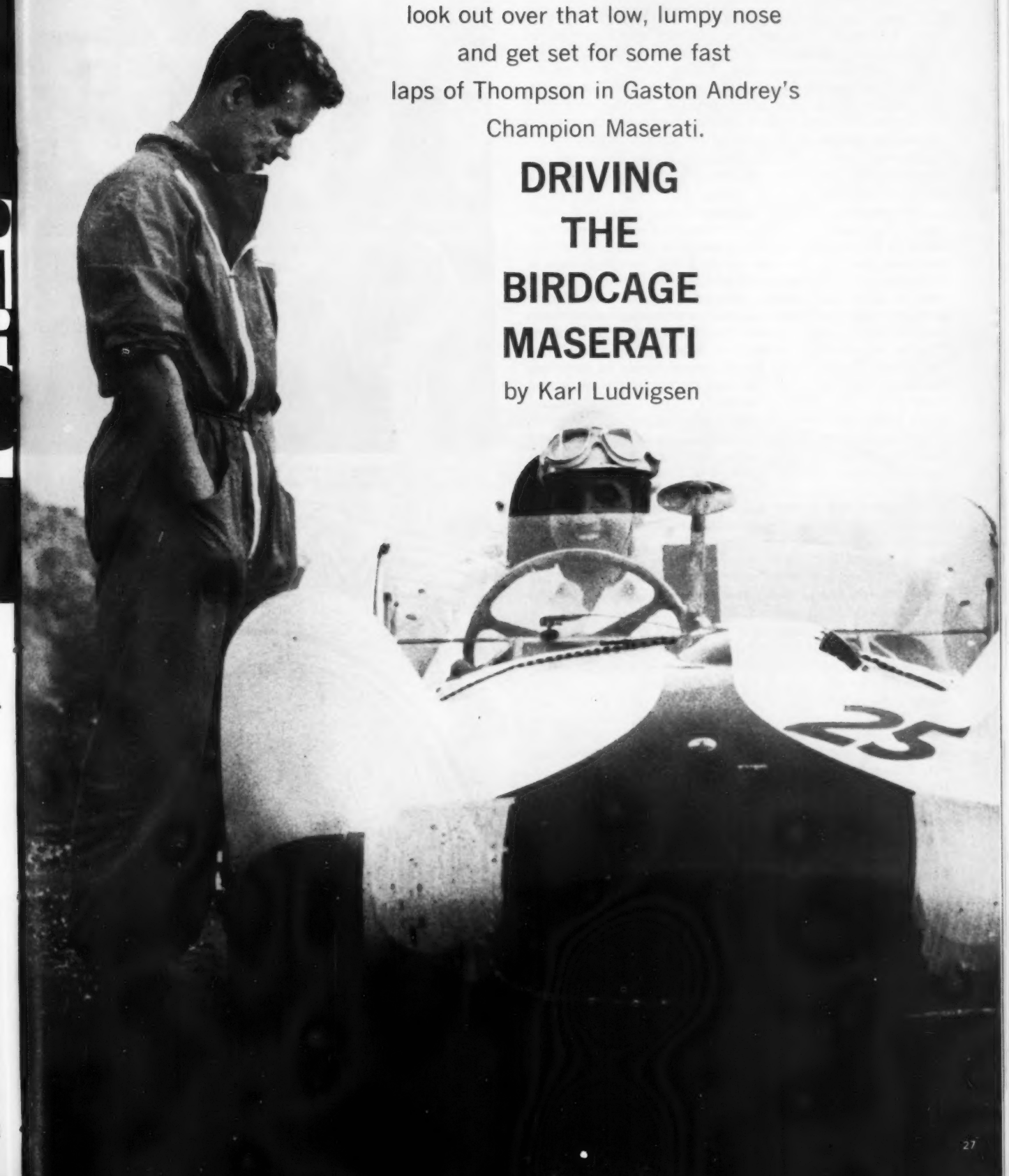
Drive in and have a talk with him without obligation, or write to: Pirelli Sales, Incorporated — 60 East 42nd St. — New York 17, N. Y. • In Canada: Pirelli — Dominion Square Bldg. — Montreal

CAR and DRIVER
APRIL · 1961

Settle into the tight bucket seat, grasp the wood-rimmed wheel, look out over that low, lumpy nose and get set for some fast laps of Thompson in Gaston Andrey's Champion Maserati.

DRIVING THE BIRDCAGE MASERATI

by Karl Ludvigsen



► When you click home the ignition key on the sketchy dash of a Birdcage, a strong red light burns deep within the broad, thumb-sized starter button. To me that light became a symbol of the vast power lurking within this apparently ramshackle piece of machinery, like glowing coals in the crater of a slumbering volcano.

If you're not already familiar with the Maserati Type 61, better known as "Birdcage", be informed by a glance at the accompanying cutaway or at the Technical Report in SCI, April, 1960. Its designer, Ing. Alfieri, broke with all the Italian traditions of chassis design and trimmed to a remarkable minimum, a step made possible by the increasing significance of short, smooth-course American races and the decreasing stature of great sports car classics like the Mille Miglia and Tourist Trophy. Only the Targa Florio remains to separate the Birdcages and Lotus Nineteens from real road-going automobiles.

This particular Birdcage is one of the very first to reach the U. S., bought by Mike Garber for Gaston Andrey to drive at Nassau and in SCCA competition. It's been very successful in both areas. In the car's first race at Nassau in 1959 Gaston felt in command immediately, being nerfed off into the shrubbery during a duel for second. Last year he took third in the Bahamas against year-younger equipment, and did well enough against Walt Hansgen's slightly hotter 'Cage to win the SCCA Class D Modified championship. The New York Times' Frank Blunk judged wisely in awarding his Sports Car Driver of the Year trophy jointly to Gaston Andrey and Bob Holbert. Certainly we're talking about one of the most consistently competitive Birdcages in the country.

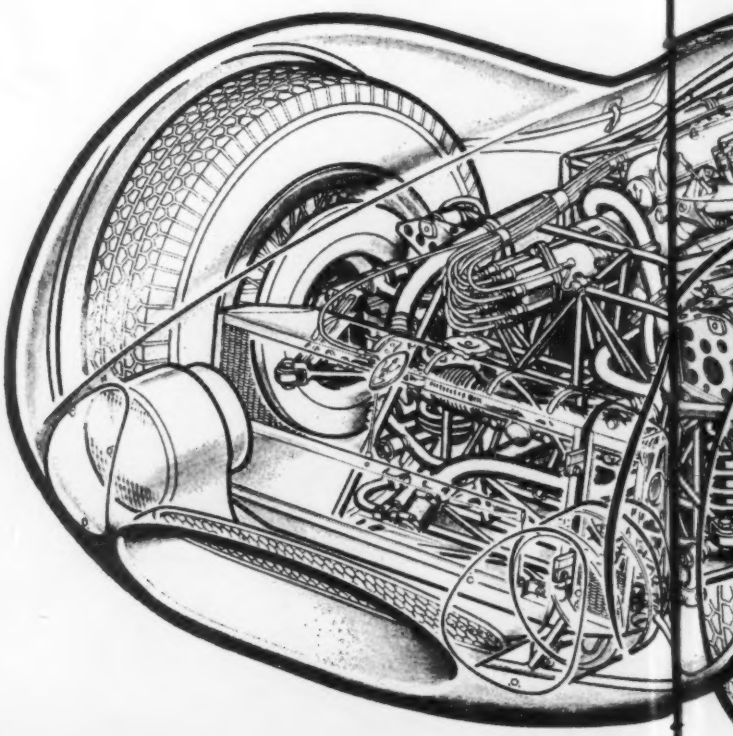
Luckily the weather was magnificent the day Irv Dolin and I met the Andrey crew at George Weaver's Thompson Raceway, in the far northeastern corner of Connecticut. Mechanic Osky Feldman had already warmed up the machine, and Mike Garber had turned a few laps. Then George Weaver, Maserati enthusiast of long standing, tried the Birdcage and came in with some interesting reactions: "After driving my big V8, 'Poison Lil', for so long, I was very impressed by the easy, light handling of my more recent 4CLT. It made 'Lil' feel like a real truck. Now, after driving the Birdcage, I feel the same way about the 4CLT!"

Naturally I was anxious to find out for myself. Gaston finds the swing-up driver's door superfluous, but I used the contraption to avoid smashing the plexiglass. Lowering myself into the bucket seat, I found that it fits tight and firm. There's no upholstery on it worth mentioning except perhaps the thickness of the red plastic covering, which is none too luxuriant. You sit low, right on the floor in fact, or as close to it as the narrow seat sides will let you. Reaching out, I found the steering wheel in just the right position. It's a reassuring wheel, small in size with the usual finely-crafted spokes but with a heavy wood rim deeply notched on its underside to provide a sure grip. It's a wheel you can really grasp.

Gaston had already relocated the seat back as far as it would go, and tilted it slightly rearwards, but leg room was still tight for me. I don't know how Shelby, Gurney, Jeffords and Hall drive these cars—but I can see why Bill Krause felt right at home! Clutch and brake pedals are quickly located, though my big feet got tangled at first with the "dead pedal", on the left, and the steering column. The throttle pedal has a long, light travel. The gear lever is placed low on the right, very close to the seat, working in a compact gate with a flip-up latch for reverse. Everything duly noted, I switched on the ignition and observed with satisfaction the evil glow within the starter button.

The engine started quickly at a poke of the button and half-throttle. First gear, for getaway only, was selected by pressing down on the lever and pulling it back into the first notch. Not surprisingly I stalled the machine at the first try

Osky Feldman and the editor probe carburetor linkage before trying the car. A cracked linkage mount slightly marred the engine's response.



at the clutch—being very leery throughout the test of overstressing the fragile gearbox—but got it away cleanly the second time. "Cleanly" is the word, too, for the Birdcage feels amazingly light as you pull away. Just a touch of the throttle seems to whisk it swiftly along.

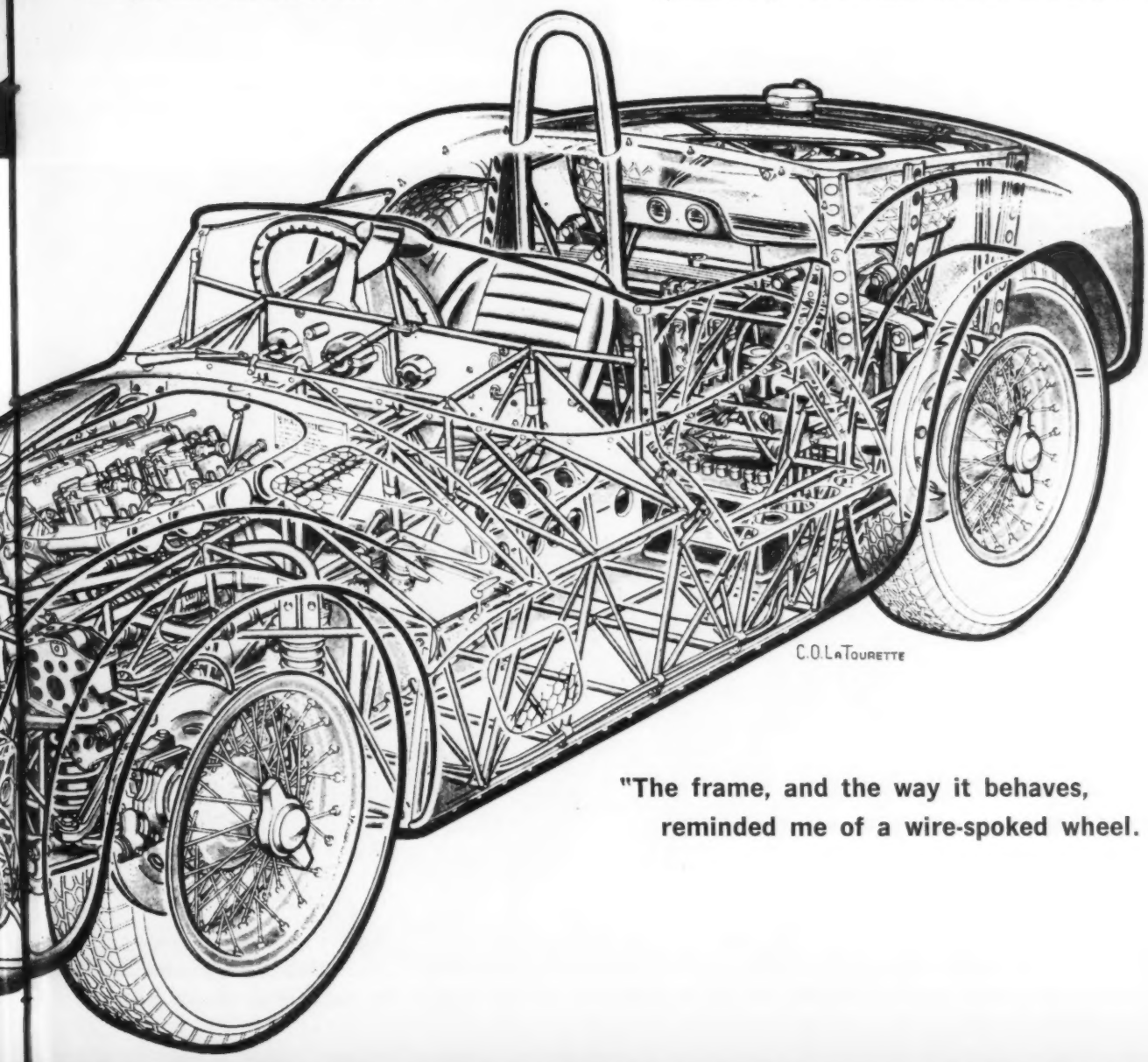
Once set in motion, the Maserati loses its loose, glued-together feel. It becomes a densely solid, single chunk of mechanism set low and steady on the ground. My eye level let me look just over the top of the windshield, down over the drooping hood with its exciting bulges for wheels and carburetors. Driving the car I was never aware of the open network of tubes behind the dash that seems so naked and disturbing to the onlooker.

Most startling of all was the *noise*. Not the expected bellow from the exhaust, but the shrieking and wailing of the drive shaft and gearbox which crowd so close to your left arm and back. At first in neutral there's a whir from the shaft, then as you pull away the car is drowned in a roaring gear whine from the cog box that seems to fill the inside of the Maser. At low speeds it almost completely drowns out the exhaust noise and seems to promise instant destruction. Once the revs are up and the car is flying you're mainly conscious of the deep, throaty note from the big megaphoned pipe that ends just under the driver's door.

This big, four-cylinder engine has a wide range of power without the "peaky" feel so often encountered in recent Maseratis. Below 2500 rpm it won't take full throttle, coughing and stuttering if you try, but from there on up it comes in smoothly and strongly. I didn't take it over about 6200, while Gaston usually uses 6500 and presses on to 7000 if he needs it. He finds that in serious competition against the likes of Hansgen and Holbert he can't let the revs drop below 4000. Since the gearing is such that on many tight courses the tach would normally fall to 2500 in second, his lowest usable gear, Gaston has to slide the tail violently to keep the wheels spinning at appropriate revs around many hairpins!

Not wanting to sample the wheelspin technique, I just enjoyed the delicious, backslamming power coming out of corners and plunging down straights. It's power aplenty for a car of this weight, but not the kind that's embarassing if you're too heavy on the throttle. Traction at the de Dion rear is the biting, geared-to-the-road variety that just propels the 'Cage forward. The impression isn't of chained violence as with the Bocar, for example, but of a perfect balance of power and chassis with one goal: covering the ground.

Solid and not too heavy, the clutch was excellent. The transmission was even better. It's hard to believe that a

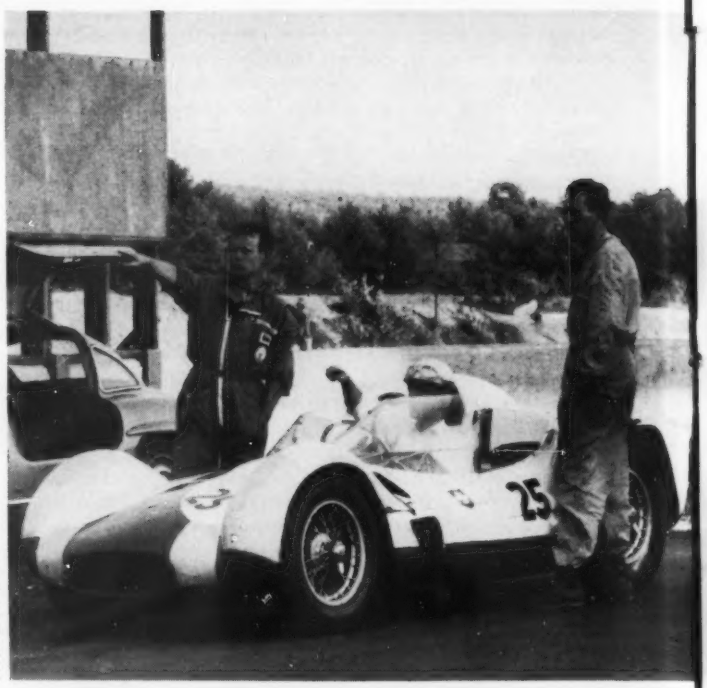


"The frame, and the way it behaves, reminded me of a wire-spoked wheel. . ."

mechanism for changing gears that looks so fundamental could be such sheer delight to manipulate. The constant-mesh spur gears are engaged by face-type dog clutches, made as shallow as possible during the most recent redesign of the box. If you don't have the relative revs just right when you essay engagement of these dogs, you can feel it in the shift lever—gently, not harshly—and you can feel just how much you're off by the frequency with which the lever quivers. If the speeds are right or nearly so, the gear goes in with such uncanny ease and speed you would swear the little lever was linked only to thin air! In many ways the Birdcage works better the faster you go; this is one of those ways. You need to get into the rhythm of very fast driving before the shifts consistently click home right. When they do it's a beautiful feeling—and lightning-fast. It literally could not be any faster.

All the while I was discovering that the disc brakes are strong and highly progressive in a way that calls for plenty of leg muscle in competition. Though Thompson calls for lots of braking, I didn't use them very hard that afternoon. I also found that the ride is hard and the seat is harder. My admiration and sympathy go out to the Andreys, Gurneys and Mosses who have driven these cars hard for long distances over trying courses. It may not be the "rocketing buckboard" that Griff Borgeson found the K3 Magnette last month, but it's certainly the 1961 equivalent. The Maserati felt flat as a plank on the road at all times, a literal "flying shingle" in the Ken Miles tradition.

Handling was completely stable, immensely so on the straight. I tried flicking the steering wheel sharply to one side at speed, as we usually do on C/D test cars, and the



PHOTOGRAPHY: DOLIN

At the end of a magnificent afternoon, Gaston Andrey pointed out the gears he uses around Thompson. Second gear gets a real workout there.

Coming down the hill from Thompson's tightest hairpin, the Maser drifts out beautifully under power. Top gear would have been engaged by now.

Yes, it certainly was a ball! The cockpit's arm room and visibility are excellent. Gaston's car has a neat headrest fairing over the roll bar.

Maser snapped back to its straight-ahead path at once without the slightest tendency to deviate. It understeers basically, accented on tight corners by its high polar moment of inertia, but this can of course be balanced by proper use of the throttle and by appropriate tire compounds and pressures. Gaston likes to set the car up so the front end's understeer just matches the rear end's drift as it comes out of medium-to-fast corners on full throttle. This means the whole car drifts gently across from the apex to the outside under power, remaining pointed straight down the road all the while. For more outward drift you press down and for less you back off, but there's never any rear-end breakaway or the like. The Maserati just sidles inexorably outward.

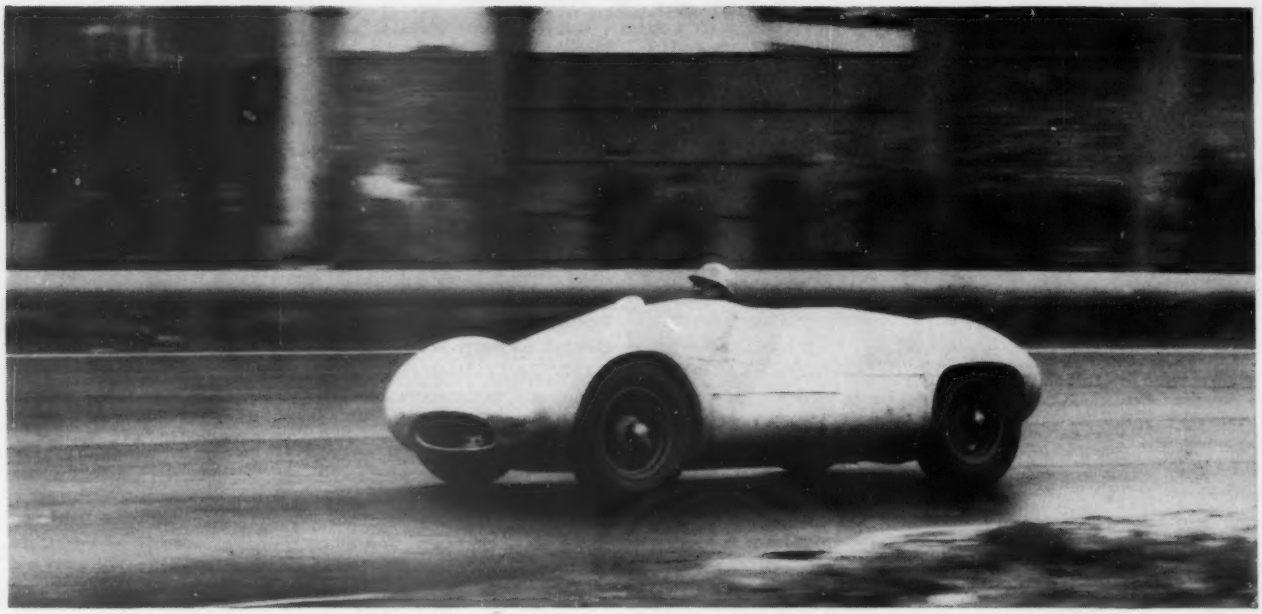
On tight corners the story is naturally different. You have to slide the tail around under power, both for speed and for the rev-range reason mentioned above, and there's ample power to do it. It's a completely controllable maneuver but somehow not an efficient one, and I suspect that the Porsches score here. Light and with a nice feel of the road, the rack and pinion steering gives you the speed and response this kind of cornering demands. Altogether I guess I drove the Birdcage about 35 miles—miles that went by much, much too fast.

Afterward Gaston, Osky, Irv and I talked over the mechanics of preparing and maintaining the Type 61. For tires they fit Firestones at the back, either soft or hard compound depending on the situation, and the "stickier" Dunlops or Pirellis at the front. They adjust tire pressures over a 34-38 psi range from a starting pressure of 36, according to the demands of the course. Du Pont's Telar is used in the cooling system, and SAE 50 Oilzum is found in the oil tank. Though 90 is suggested, the crew has learned from experience to use 140-weight oil in the gearbox, or even 240 for long races. The plugs are Lodge RL49, RL50 or RL51, depending on the race and the weather.

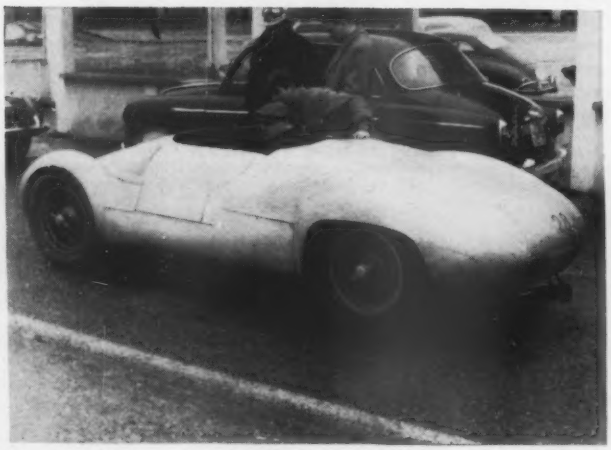
Cars like these are obtained from Rallye Motors, in Glen Cove, Long Island, and Maserati Representatives in Beverly Hills, California. The price is a remarkably cheap $10,500 at the factory, which comes to about $12,000 when duty's paid and the car's air-landed here. It's a special bargain when matched against the $16-17,000 being charged for a Lotus Nineteen! Over twenty Type 61s have been built, enough to keep Maseratis winning around the globe.

Osky and Gaston expected a brand-new Birdcage to require minimum maintenance, at least for the first season; they found this wasn't the case. About the only things that *haven't* given trouble, in fact, are the clutch and the Girling-design brakes. The frame, and the way it behaves, reminded me of a wire-spoked wheel: when it's whole, it's very solid; when one spoke breaks you don't know it but it leads to progressive breakage of the surrounding spokes in an evilly unobtrusive manner. It's just that way with the lacework of tiny tubes in this "soda-straw special." Osky has been hard put to keep up with all the welds in this frame, but at least he knows where to look now when the car starts acting queasy under heavy braking. Vigilance of this kind is a small price to pay for a car that performs so dramatically, excitingly well when it's right. Maserati's trying to top it, though; don't miss the rear-engined Type 63 Birdcage on the following page. —*KEL*

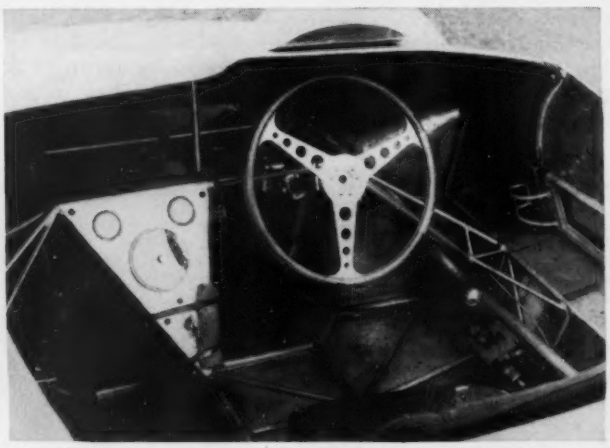
Accelerating hard out of tight corners, the Birdcage just rocketed away without time-wasting tailwagging. Deliberate breakaway was easy, though.



Scarlatti drove on the Type 63's second Modena outing. Low frontal air intake houses two separate water radiators and a central tubular oil cooler.



Driver Scarlatti and designer Alfieri confer grimly as head mechanic Bertocchi takes the wheel. Prototype was fitted with Goodyear tires.



Only Martin Tanner has tried a smaller dashboard. Dramatically stark cockpit shows soda-straw structure greatly simplified over old Type 61.

MASERATI TYPE 63

► The much-rumored rear-engined sports Maserati finally appeared at the Modena Autodrome on December 19th, for a five-minute test that was terminated by "mechanical difficulties." It came out again on the 21st, when these photos were snapped. After the day's runs Giorgio Scarlatti said he liked the car's behavior but that the handling still needed some development.

With aluminum shielding erected temporarily in place of the wrap-around windshield, as Maserati usually does on prototype cars, the Type 63 resembles nothing so much as the ungainly Volkswagen specials that were built in Germany right after the war. The high back houses a normal 2.9-liter four-cylinder engine at present (the stroke may be lengthened to bring it nearer 3 liters), canted to the right as on the front-engined cars. Spaghetti-type frame construction is retained, though completely redesigned to simplify the cockpit and accommodate the coil and wishbone independent rear suspension. The five-speed Type 61 gearbox is also retained, connected to the engine in the same general manner as in Brian Naylor's Grand Prix J.B.W. It's not a lovely car but then neither is the Type 61, which goes very fast anyway.

—Peter Coltrin

High back line allows Weber carbs to be almost vertical, above angled engine. Carbs are the same type as were fitted to the 450S Maserati.

SHOWTIME IN NEW YORK

Five years ago New York's Coliseum on Columbus Circle was opened with a dazzling automobile show. Since that time this show, under the management of the Charles Snitow Organization, has grown and prospered against considerable competition to become THE exhibition of its kind in this country, and a showplace of key importance to overseas car-builders who want to crack the U.S. automotive market. The Fifth Annual International Automobile Show will open its doors once again from April 1 through April 9. CAR AND DRIVER heartily recommends that you make special plans to come to New York for this unique exposition; in fact we assume you're coming so we've prepared the Enthusiast's Guide to Manhattan on the following two pages.

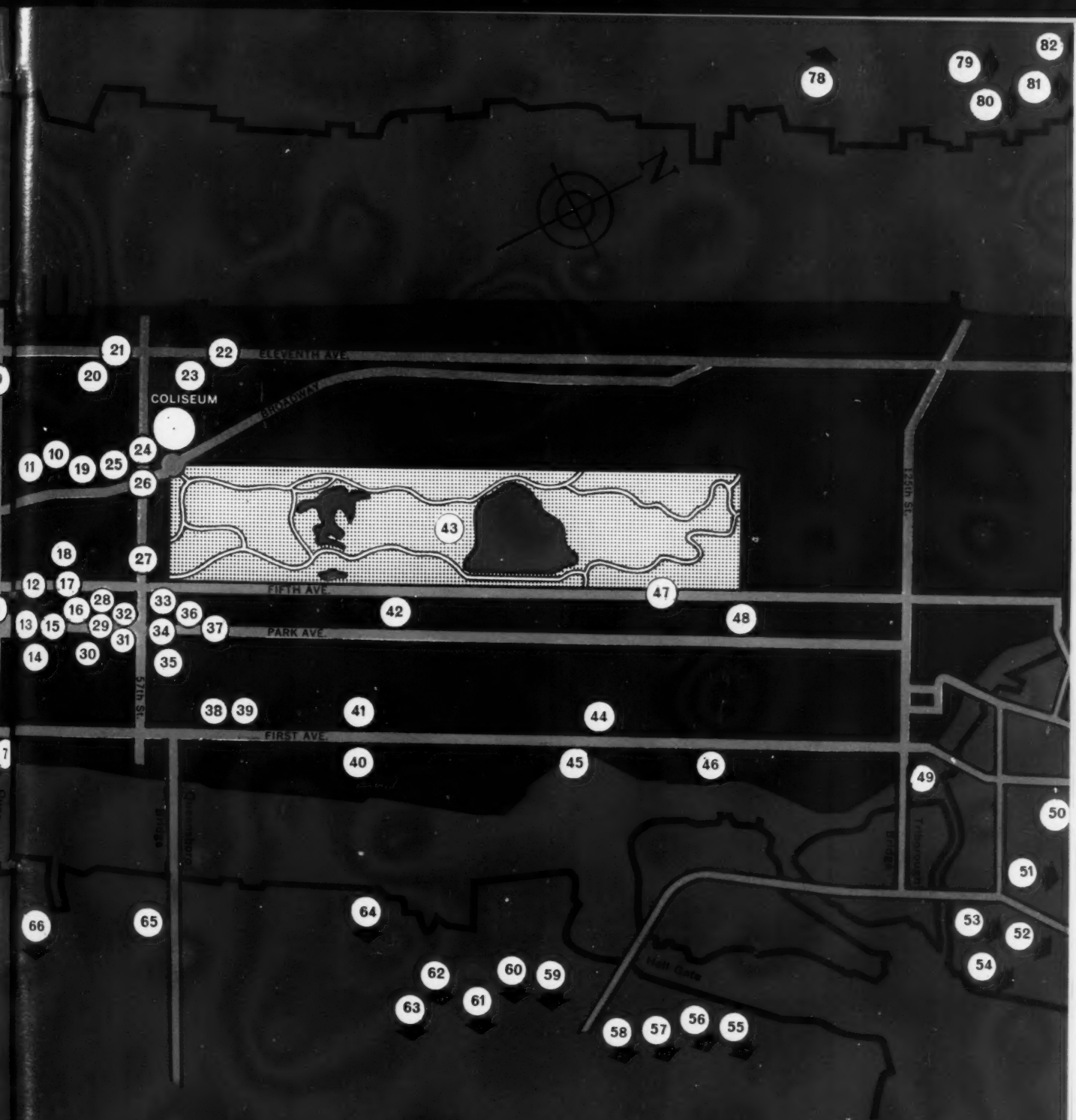
Our sometimes-fanciful, usually-useful (we hope) Guide will direct you to major points of automotive interest on this crowded island, and show you the general direction of attractions scattered in other boroughs and the suburbs, exurbs and Connecticut up-country. If you drive to New York — which is only logical — be sure to bring a sports car or domestic or imported compact car, because we're already crowded enough as it is!

Of course the central attraction is the Coliseum, which this year will again house the CAR AND DRIVER Concours d'Elegance in addition to all the machinery you can buy. If you were at the I.A.S. last year you'll remember the Concours, which was a general success with many exciting cars, and if you weren't there you probably recall our story on it in the August, 1960 SCI. At this early date the 1961 Concours is taking shape very well, one definite attraction being Bill Burke's Falcon streamliner. It will be a show-within-a show you'll want to see.

Recognizing the mature status of the International Automobile Show, CAR AND DRIVER for May (on sale April 4) will be a special premium-priced show issue featuring the many major new models set for introduction at the Coliseum. It's a guide to the show, and a permanent reference, you won't want to miss. Make your plans now, pack up the car, pick up your May C/D and come see us at the show!

Enthusiast's Guide to Manhattan

1. Traffic Courts
2. Police Headquarters
3. Stefan's
4. Bucket Seat, auto accessories
5. CAR and DRIVER office
6. Midtown Tunnel Dragstrip, 25¢ entry fee
7. United Nations subterranean ride comfort test
8. Pirelli Tires office
9. Lucas-Girling
10. Riverside Records
11. Vince Sardi's West
12. Fiat office
13. Charles Kreisler
14. SAE office
15. Citroën showroom
16. F.I.A. office
17. Daimler-Benz
18. Le Chantecler
19. Frank de Langton
20. Zumbach's
21. Luigi Chinetti, Ferrari
22. Citroën service
23. Kensington Products, Koni shocks
24. Standard-Triumph office
25. Don Allen Chevrolet / Pontiac
26. Sorgwerk/Morgen showroom
27. Hambro showroom
28. Inskip showroom
29. Renault/Peugeot showroom
30. Vince Sardi's East
31. Hoffman showroom
32. Saab Motors Inc.
33. Volkswagen showroom
34. Facel-Vega showroom
35. Panhard showroom
36. R. Gordon, motoring books
37. Rootes showroom
38. Saab showroom
39. Inskip service
40. Hoffman service
41. Buckingham Livery, Rolls-Royce rentals



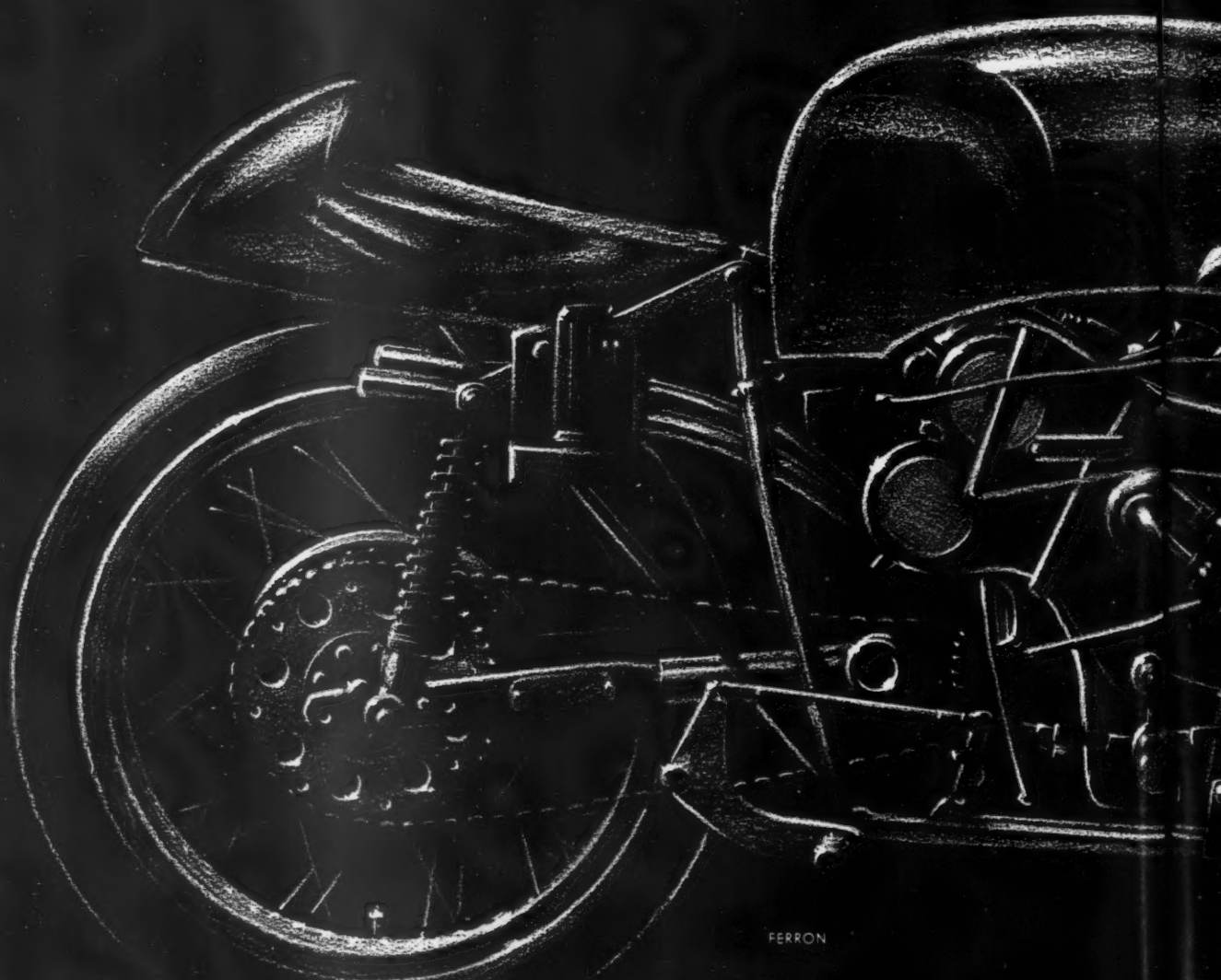
42. AAA office
43. Grand Prix circuit of Central Park
44. Inskip service
45. Volkswagen service
46. Hurner Binder Co., auto painting
47. Museum of the City of New York
48. Columbia Motors, auto parts
49. South and North bound entrance to Triboro Bridge from Manhattan
50. Motorcycle Division, New York City Police
51. Lime Rock Park
52. Thompson Raceway
53. Grand Prix Engineering
54. Nisonger
55. Roosevelt Raceway
56. Bella Vista
57. North Country Motors
58. Rallye Motors, Maserati
59. Austin Clark's Museum
60. Bisner Pontiac
61. Steve McClellan's place
62. Bridgehampton
63. Renault/Peugeot service
64. Memo's, Jaguar
65. Rootes service
66. Fisher Products
67. Jaguar parts
68. Rover service
69. Fiat service
70. Robert Bosch
71. Bill Frick
72. Grand Prix circuit of Idlewild Airport
73. Spindel's place
74. Warren Weith's place
75. California Speed and Sport
76. Ed Brown
77. Malcolm Konner Chevrolet
78. Tom O'Brien
79. Volvo office
80. Leonard Putter
81. Bob Grossman
82. Volkswagen office

RACING CYCLE ENGINES/by Federico B. Kirbus

For the new Grand Prix Formula, designers will look more closely at the tiny but potent racing cycle powerplants.

Probably many CAR AND DRIVER readers are apt to think that current Grand Prix car engines represent the highest achievements to date in piston engine design. However, it isn't so, because in spite of severe fuel limitations (current racing motorbikes are restricted to an 80-octane diet) cycle mills have always been ahead of car engines in every aspect of efficiency. This isn't because motorcycle engine designers are smarter, but because scale effect allows smaller powerplants to attain higher rpm figures without exceeding the safe piston speed limit, and also makes it feasible to get more square inches of piston area per liter without resorting to unworkable bore-stroke ratios. In fact, the fastest racing motorcycle engine of today has a stroke greater than its bore!

As of today, while Grand Prix designers have but recently really cleared the "100 bhp per liter" barrier, motorcycle engines, especially in the smaller capacities, are at 140 bhp/liter, while as long ago as 1954 a four-cylinder 500 which produced 55 bhp was shrugged off as "disappointing" and it was theorized that the power output must have been taken at the rear wheel instead of on the bench!



FERRON

What is it that goes into successful racing motorbikes? In the years before the war, when superchargers were allowed in road racing, some pretty high power outputs were already being attained. The Germans were among the most active in the successful application of blowers to motorcycle mills, and the 500 BMW and piston-supercharged DKW two-stroke are particularly remembered, especially for their victories in the Tourist Trophy in 1938 and 1939. In fact BMW started working on superchargers in 1927 with its R.37 "five-hundred" which developed 20 bhp from its 30.5 cubes, an impressive power output for those days, although it was just about that time that car designers were beginning to realize that superchargers were more than just another accessory. The R.37 BMW subsequently went up to 31 bhp in 500 racing form, and 40 bhp as a racing 750, the supercharger spinning in either case at engine speed – 6000 rpm.

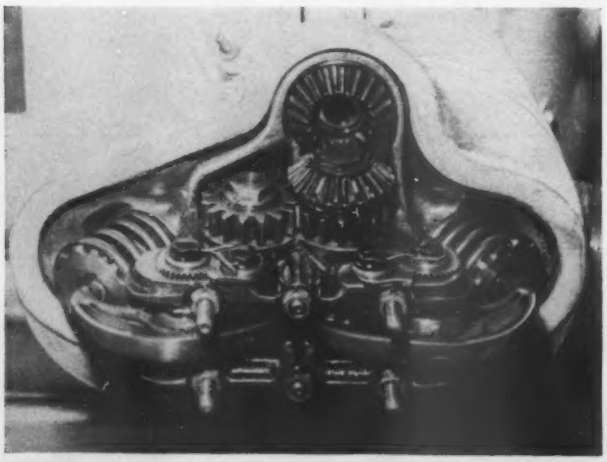
Right from the beginning BMW employed Zoller superchargers or a modified form of same and in fact vane-type blowers were to become almost universal in cycle racing practice. The Roots type never was popular, and was only used with some success on

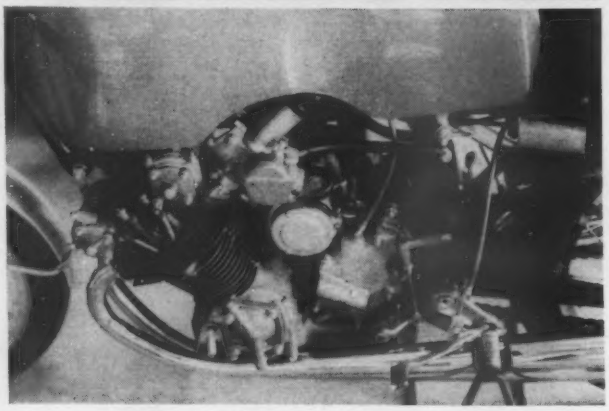
WEITMANN

John Surtees plans to abandon the bikes for four-wheelers only this year. He was unbeatable on the MV-Agusta fours, as here at Solitude.

the four-cylinder Gilera Rondine, predecessor of today's four-cylinder M.V. racer. The Rondine, drawn up by a group of aircraft designers, had a single Roots which fed into an expansion chamber and thence into the engine, the idea perhaps being to even out the intake pulses by providing a sort of cushion; this ante-chamber idea has not, as far as we know, been used in automobile design. Later the Rondine was taken over by Signor Gilera, but its career as a supercharged machine was cut short just about then by the war, and it subsequently reappeared in refurbished form as an unblown racer of enormous power.

In time BMW got down to designing its own supercharger, a lightweight four-bladed affair which demanded – and got – the most accurate production techniques it needed to work properly. In time some really astonishing power





Valves play a part here. At the top is the racing BMW o.h.c. layout, and below it the Honda four, with 4 nickel-sized valves per cylinder.

outputs came through the drive sprockets, as much as 95 bhp on 80-octane fuel after the war. By this time the push was becoming too hard for the rest of the frame to take, but on very fast circuits the supercharged BMW traveled like blazes (134 mph for a lap at the Grenzlandring, for instance).

The BMW, of course, relied on the traditional flat-twin design, and in the old supercharged days the single vane-type blower was mounted on the crankcase, in line with the crank, and fed the two cylinders through long intake pipes of curious shape and unequal length – a fact which indicates that a supercharger will let you get away with murder as far as induction tracts are concerned. After the war the Germans were not allowed to participate in international racing until 1950, so they kept on racing their blown machines until '51, when they were again admitted to the FIM, or *Federation Internationale Motocycliste,* and had to fall into line with the rest. The major triumph of the BMW up till war's beginning was bagging the Senior Tourist Trophy in 1939 at 89 mph, Georg Meier riding a very modern-looking machine with telescopic front suspension and a sprung rear end (at a time when even racing machines often had no rear suspension) and a 58 bhp @ 7000 rpm mill in a package which only weighed 400 pounds all-up without rider! At the time it was reported that the supercharged Gilera was churning out 70 bhp, but weight was far higher.

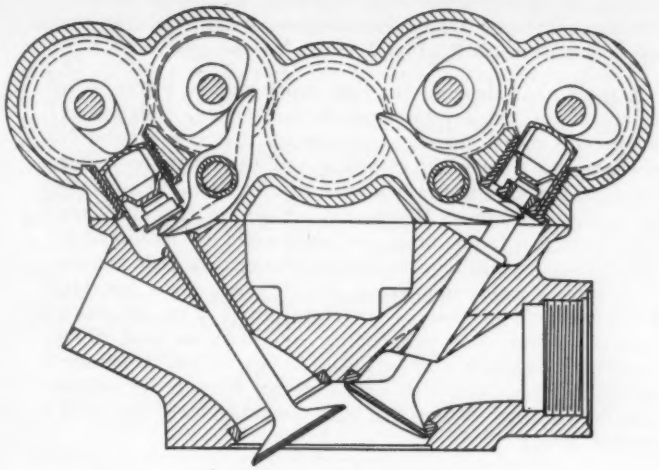
The other successful supercharged machines were the two-stroke DKWs, and during their experimentation a number of theories were tried out. At first they did a lot of work on "charging pistons," that is to say plungers working on the air-compressor principle and feeding the crankcase under pressure. Of course a two-stroke engine sucks its air not into the combustion chamber, but into the crankcase, whence it is sluiced up into the chamber by the crankwebs; thus the idea was to pressurize the case. DKW first tried a wide, flat plunger directly opposite the engine cylinder and working off the same crank; then it adopted the twin-piston or "split-single" design where two con-rods and pistons work off a common crankpin and share a common combustion chamber. Together with this layout DKW designed a horizontal, side-mounted charging cylinder (*Ladepumpe*); this worked very well once some initial difficulties had been overcome with dynamic balancing. Actually the 90-degree *Ladepumpe* was exactly the same as the 180-degree design but induction tracts were shorter and the engine was less tall. Subsequently experiments were made with swinging-gate and turntable-type passage valves to the charging piston; finally the DKW designers fell into line with their four-stroke brethren by going all "vane-type," but then war came, so that was the end of that.

After the war DKW came up with a remarkable unsupercharged device which boasted three cylinders, but not in line like the DKW, Saab and Auto Union cars of today. They had conducted some initial experiments with rotary-valved 125 and 250 cc 2-strokes, then went up to 350 cc (22 cubic inches) with their new 3-cylinder contraption which had two of the cylinders parallel to each other and the remaining, central, one inclined 75 degrees forward! As the parallel cylinders were not truly vertical, the lone forward cylinder lay horizontal and thus had axial finning, while the other pair employed the more conventional radial type. While results were good, the 3-cylinder DKW never quite equaled contemporary four-strokes in sheer power output (28-30 against 32-38 for the current NSU and Gilera). Later they were detail-redesigned and managed to produce 40 bhp, but by then the opposition was going faster still.

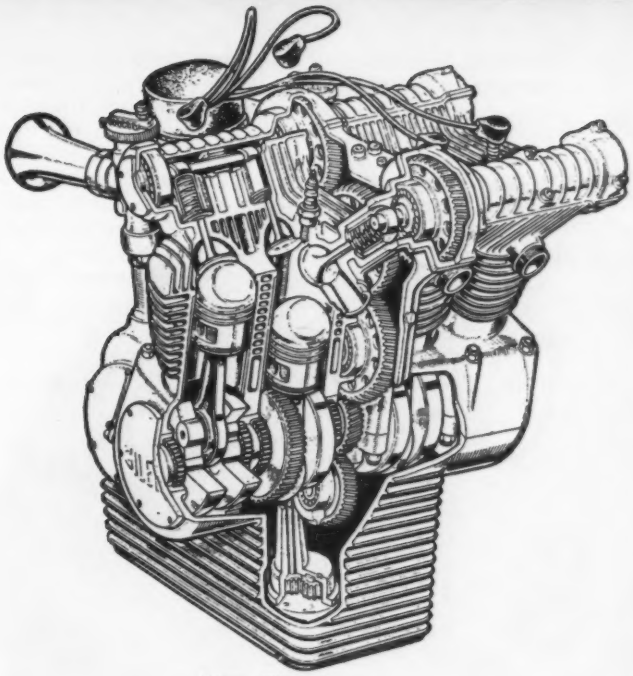
NSU started working on a supercharged twin in 1937, originally for sidecar use and of 750 cc. Subsequently this engine was scaled down to 500 cc for solo use, but proved too heavy and cumbersome so the design was scrapped. After the war, ex-works rider Herz was looking through the rubble of the bomb-destroyed NSU factory when he found the old supercharged twin. He took it home with him and began cleaning it painstakingly with a wire brush. Five years later this engine broke the motorcycle world speed record, which had been standing since 1937, with a figure of 181 mph! Later on this figure was further improved by a new design. A 350 version was also built for class records, neither of the two engines ever being raced.

Both had Hirth-type built-up cranks with roller mains and big ends, and the cylinder measurements were 56 x 70.5 mm for the 350 and 63 x 80 mm for the five-hundred. The exhaust valve was internally cooled with sodium. Due to using a 2.4 ata supercharger, valve timing was not extreme (40-45-82-40) compared to the corresponding Norton figures

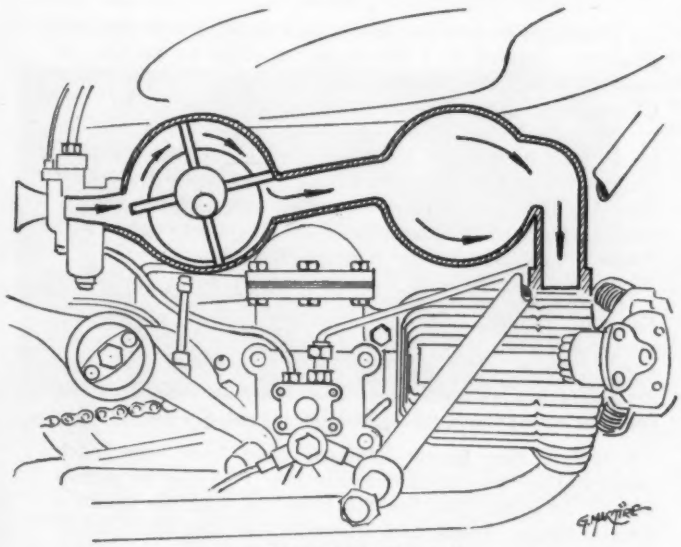
(*Continued on page 76*)



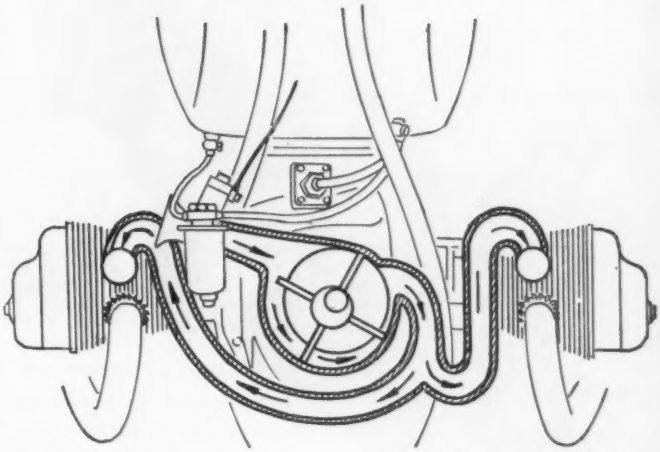
experimental Norton desmodromic head



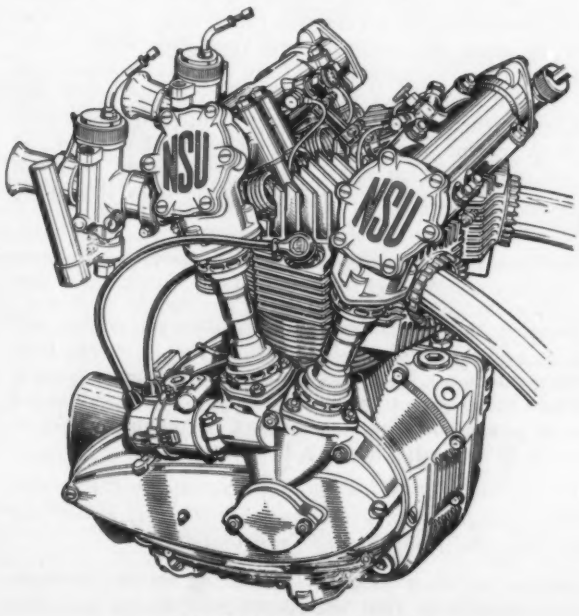
Gilera 500 cc four



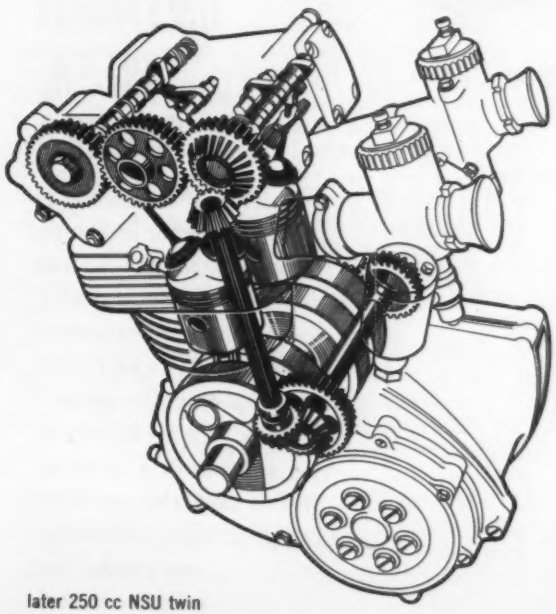
blown 250 cc Moto-Guzzi single



blown BMW twin



early 250 cc NSU Rennmax twin



later 250 cc NSU twin

WEITMANN

UHLENHAUT ON THE NEW FORMULA

Rudolf Uhlenhaut is chief engineer in charge of passenger car research for Daimler-Benz. Beside being a talented development engineer, he is a very, very fast driver on both road and race track. His views on this year's Grand Prix Formula, in this exclusive interview with C/D's Jesse Alexander, are candid and uniquely expert.

You successfully chose eight cylinders as the ideal number for a 2½-liter Grand Prix engine. What would be the ideal number for a 1½-liter Formula engine, and why?

I think that depends on how much money you're able to spend on the development of the engine. Judging by motorcycle racing engines, I should say that it is absolutely necessary to have small cylinders and very high revs. For example the MV Agusta has four cylinders for 350 and 500 cc, and the Japanese Honda has a four for 250 cc. They proved to be faster than the single-cylinder motorcycles, and I think it will be the same in racing cars. It is certain that with a large number of cylinders—say eight for 1½ liters—you will be able to get more power than, say, with a four-cylinder, and with better reliability as well. The penalty of weight has to be balanced against the advantage of higher power, but with careful design I think the weight can be reduced so far that the advantage will lie with greater power.

Is air cooling adequate for a very-high-output unblown 1½-liter engine, or will water cooling be necessary to combine high output with reliability?

I personally haven't had any experience with high-powered air-cooled engines, so I shall have to judge by motorcycle engines. It is a fact that the four-cylinder MV Agusta and Gilera—both air-cooled—were and are very powerful, but on the other hand it isn't possible to use the very high power of these engines for an extended time on a motorcycle, while it is possible in a racing car—or easier, at any rate. I would say that for *very* high continuous effort, a water-cooled engine is superior to an air-cooled engine, and I would think it would be more reliable also.

Intake port design will be very critical in the 1½-liter Formula engines. British designers now favor a carefully restricted intake port, intended to keep gas velocity fairly high. This would seem to be in opposition to your port design approach, which has always featured big ports of constant diameter. How do you feel about this today?

I believe that British designers have been very much influenced by the carburetors they use. To get good pickup with a carburetor you have to keep gas velocities up to a certain height. Using fuel injection, on the other hand, you don't have to consider this. We did a lot of experimenting with ram pipes of different lengths and diameters, and we found that we got the best compromise in the torque curve by using comparatively long ram pipes with a comparatively large diameter. But as I say, this was a compromise, and we had prepared a design with a variable-length ram pipe arrangement. The length changed automatically according to the engine speed, that is, long pipes for low speed and shorter pipes for high speed. We never actually used this device in racing, but we did intend using it in 1956 if we had continued.

How would you assess the potential of the Wankel engine for 1½-liter G.P. racing?

Assuming that development of the Wankel engine will show it to be reliable, I should think that it would have a very good chance. It has been proven that its power output and fuel consumption are both good. It is much lighter for a given power and displacement, but its reliability still remains to be proved. That's all I can say.

Is a rear-engined car an absolute necessity in G.P. racing today? In other words, would you unhesitatingly choose this layout over the front-engined configuration?

I think you must judge by the racing results of recent years. Especially in 1960, the rear-engined racing cars have been very much more successful than the front-engined

cars, so one must conclude that a rear-engined car, at the present state of development, seems to have advantages. If we were to design a new racing car at Daimler-Benz we should have to think over the whole situation very thoroughly, and just now I don't think I could say definitely what we would do. If we had enough time, we would most probably build a rear-engined car and a car with the engine in front, and see which produced the best results.

Shortly after the war, when I wasn't working for Daimler-Benz, I designed a small racing car to take either a supercharged 750 cc engine or an unsupercharged two-liter engine, placed transversely in the rear. So even at that time I judged that the rear-engine arrangement would be more suitable for small racing cars.

How can this view be reconciled with the pre-war and post-war Mercedes adherence to front-engined layouts, as opposed to the Auto Union approach? Also, how can the Mercedes ideal (as expressed by you) of a high polar moment of inertia be obtained in a rear-engine design?

In pre-war days, experience was quite limited regarding roadholding, especially in regard to over and understeering, and at that time it didn't seem possible to make a rear-engined racing car neutral or understeering. The 1934 to

Uhlenhaut tries the "training" W196 Mercedes in the rain at Spa, 1955.

'37 Auto Unions, which had swing axles with a high roll center at the back, were very strong oversteerers and consequently very few drivers were able to handle them at very high speeds. On the 1938 three-liter model, Auto Union used a de Dion rear axle, as Mercedes did on its front-engined cars, and these rear-engined cars had much better roadholding than the earlier ones.

We had very little time in 1953 when we designed the cars for the '54 season, so we naturally kept to a general layout whose behavior we knew quite well. We didn't go on using the de Dion axle because this had certain disadvantages, but put on a new sort of swing axle with a low roll center at the back, which proved to be successful. With this arrangement it was possible to tailor the car to the conditions we wanted, that is, make it understeer or oversteer. If we obtained a comparatively low polar moment of inertia, by putting the fuel tanks in the middle, we found that this type of car was more suitable for courses with a lot of acute bends, like Monte Carlo. On the other hand it had a disadvantage, because its lower percentage of weight on the rear wheels made wheelspin more apparent. From the start our cars were always faster than the Ferraris, which had about 50/50 weight distribution, while we got as high as about 60 percent on the rear axle, fully laden.

The cars with a low polar moment seemed to be rather tricky on very fast bends; that is, if the car did break away it was more difficult for the driver to correct it. With a high polar moment of inertia the breakaway was more gradual and slower, giving the driver more time to correct. I must say I have the impression that these new rear-engined cars show the former tendency, because you cannot deny that there have been quite a number of accidents that indicate this. They are extremely fast on acute bends and narrow curves, but if they have broken away they seem to be rather difficult to catch. That may only be an impression; I haven't driven the cars myself.

We experienced something similar in the pre-war period. The Auto Unions of 1934-37 were very difficult to drive, and there was really only one driver, Rosemeyer, who could use full power and could manage these cars on both fast and slow corners. All the other drivers had to go slower and had a high number of accidents as well. Incidentally Nuvolari never managed to go very fast on the 1937-type Auto Union, while he did go fast on the 1938-39 model after some experience.

How significant were the shortening of G.P. races from 300 to 200 miles and the change from alcohol to Avgas in the recent switch to rear-engined cars?

I think the shortening has had a great influence on the design of racing cars. We made a point—and this was absolutely necessary—of having tanks to get the car through a 300-mile race with a good reserve, because at that time it proved that if you had to stop the car it was often very difficult to pick up the thirty or forty seconds you lost in retanking. Because of this and the use of alcohol, tanks had to be comparatively large, which naturally made the car heavy when starting fully laden. This meant strengthening the frame, the wheels and the suspension, and it was also quite difficult to find the necessary space. I do think that the reduction of tank size made the introduction of rear-engined cars easier.

We have a great deal of experimentation in rear suspension design at present; who seems to have the best solution so far?

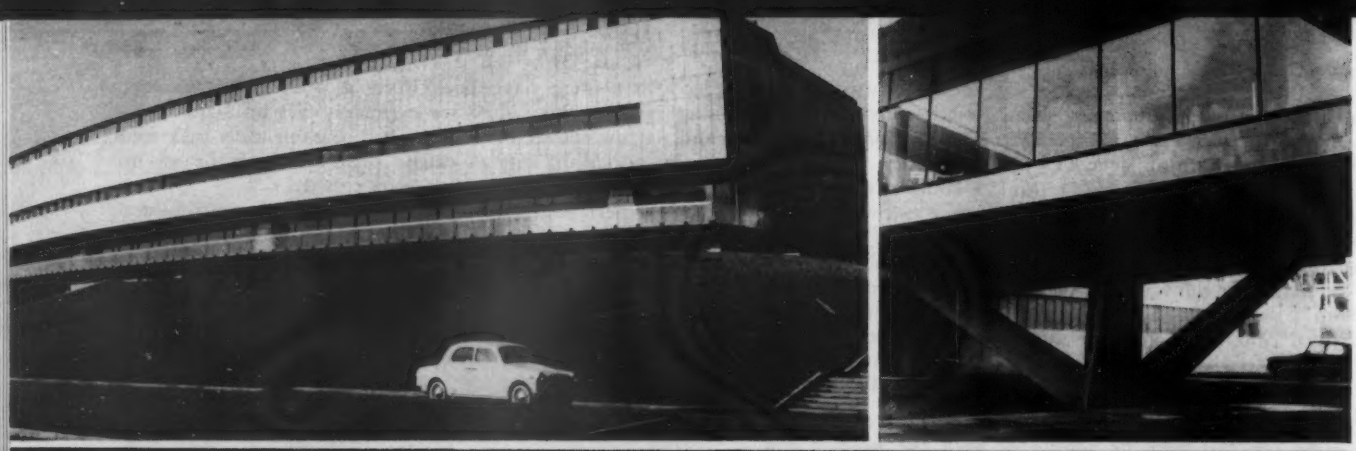
Judging by the latest racing results, I think that the arrangement which the Lotus has is most successful. It seems to be more stable than the Cooper, but I can only judge by looking at the cars as I haven't driven them myself. If we started designing a racing car again, we would certainly build cars with different rear suspension arrangements and try to find out again which solution would be best for present-day conditions.

How significant a part has progress in racing tire design and construction played in the continuing rise in lap speeds?

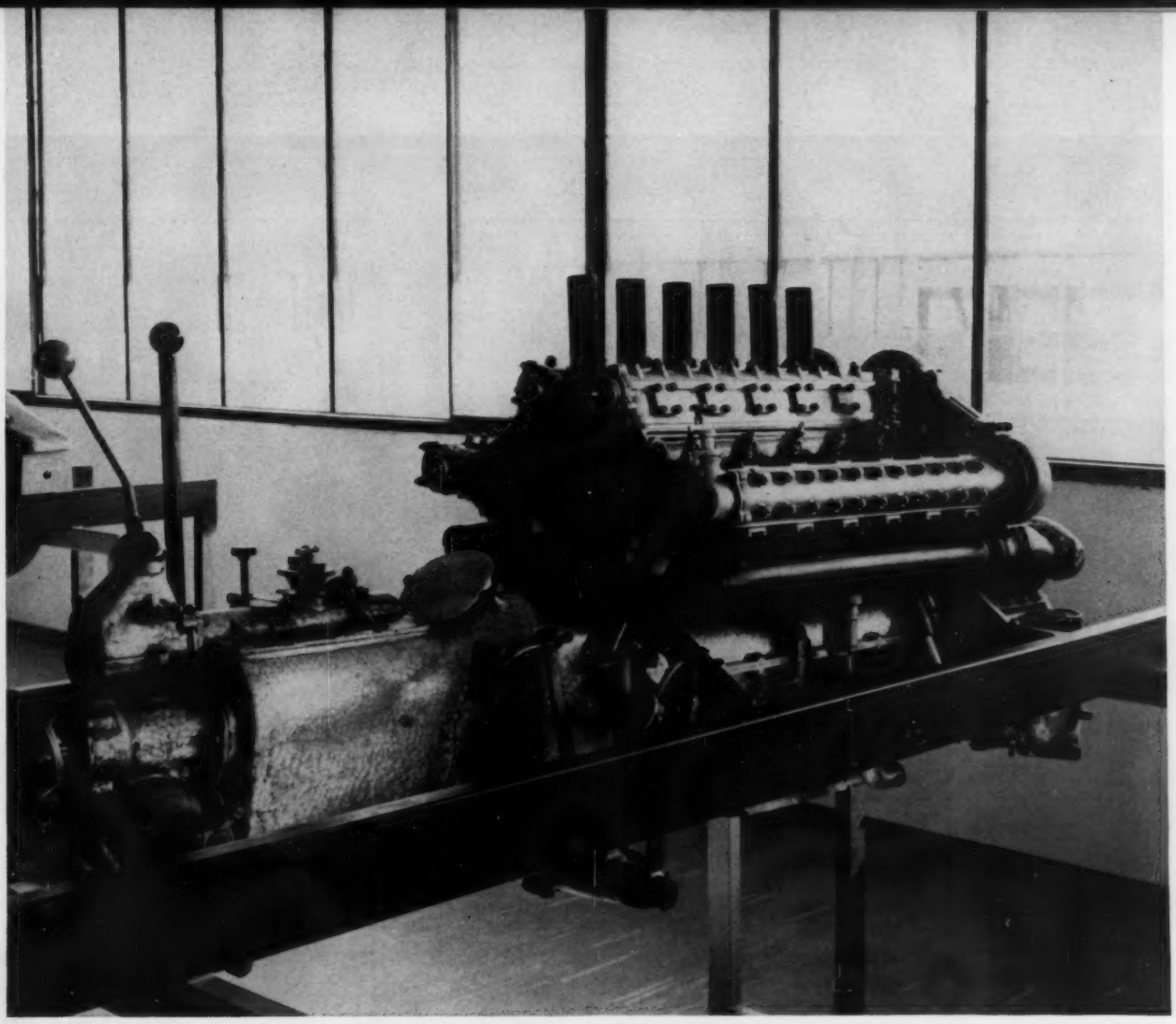
I am absolutely convinced that progress in this field has made the constant rise in lap speeds possible. The side bite has been increased very considerably, which makes possible higher cornering speeds; tire adhesion on wet surfaces has been improved, and the rate of wear has been reduced. I remember that in pre-war days we used three sets of tires in a 300-mile race on the Nürburgring, and the tread depth was 17 millimeters. Now a complete 300-mile race can be run on one set of tires which, in our case, would have stood another 50 miles' racing. So I think the progress of racing tire designs has really been tremendous.

Mr. Uhlenhaut, despite all the denials from the factory, people still say that you're going to come back into racing soon. How about that?

It is absolutely definite that we are not coming back into racing in the near future. Naturally I can't speak for the next ten years, but with the present working conditions – the amount of work on passenger cars we have to do with the manpower available – it really is nearly impossible even to think of it. Sometimes a rumor arises because we take our racing cars out on our test track and have a drive. Some people think that means the start of a new era, but it definitely doesn't. I personally just take the cars out because I like driving a racing car and I like to have a fast drive now and then!



Turin's new Motor Museum, located south of the city along the Po River, at Corso Polonia 140, was very handsomely designed by Amedeo Albertini. The lower photo shows the main automobile section, the sports section being up the stairs to the left.



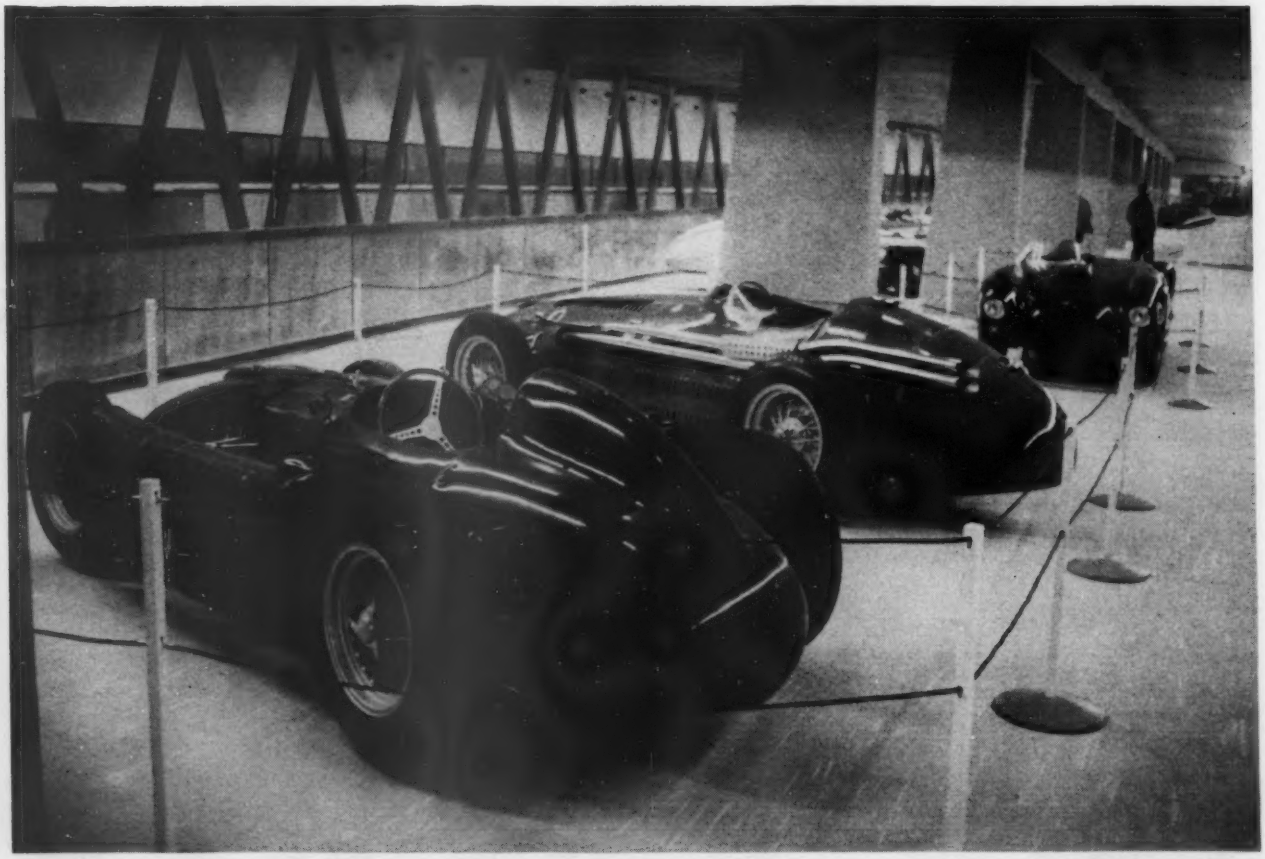
Enrico Nardi donated this 1925 Grand Prix Delage engine and gearbox. It's a supercharged 51.3 x 80 mm roller-bearing V12.

Museo dell'Automobile

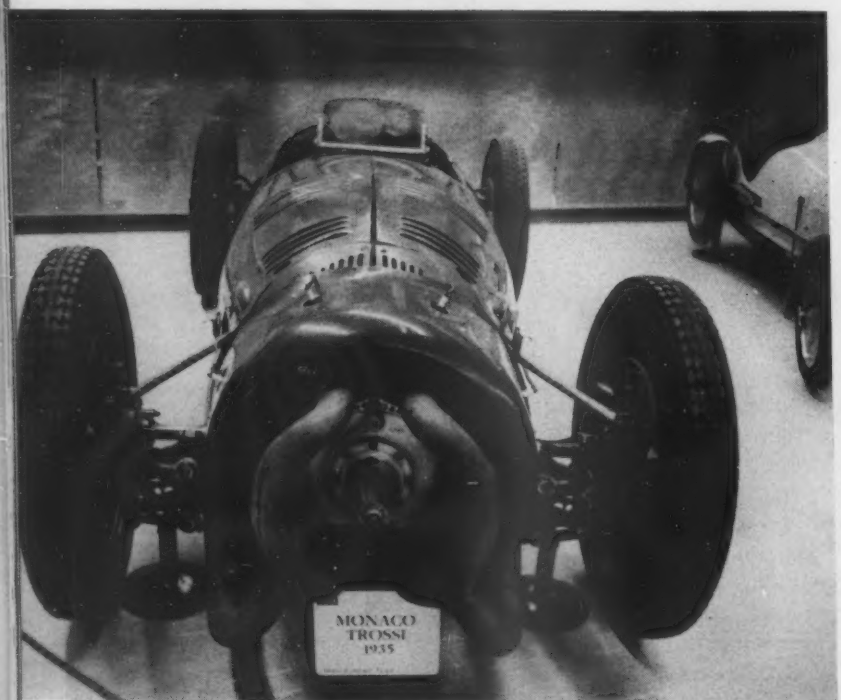
The world's most magnificent automobile museum has just opened in Turin, Italy. Let the skilled camera of Jesse Alexander take you on a private guided tour.

Officially this is the *Museo dell'Automobile Carlo Biscaretti di Ruffia.* Since 1932 Count Carlo, a talented artist and historian, had directed the selection and aquisition of automobiles, naturally with emphasis on Italian machines. He was supported by the city of Turin, which housed the collection under the stands of the city stadium. By 1956 the "Museum" was of such stature that Italy's Agnelli family and major car and accessory makers banded together to finance construction of a proper building on land provided by the city. The result is a perfect blend of Italian artistry in two areas: architecture and automobiles. It now houses 120 cars, 20 engines and 30 two-wheelers, a growing library, a 350-seat auditorium, and special petroleum and tire sections. There's also parking room for 200 cars outside, fortunate since the *Museo* is a must for all readers of C/D.

A special exhibit at the Museum's opening was the experimental Fiat turbine car. It was first publicly shown in April of 1954.

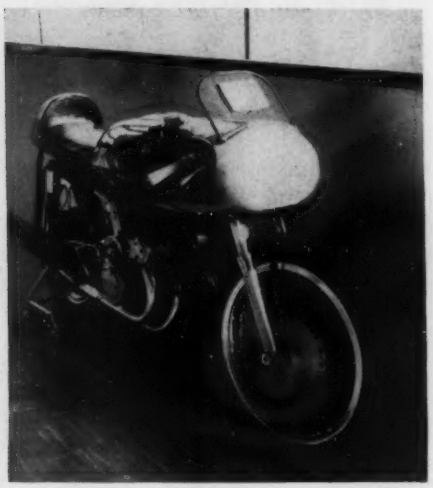


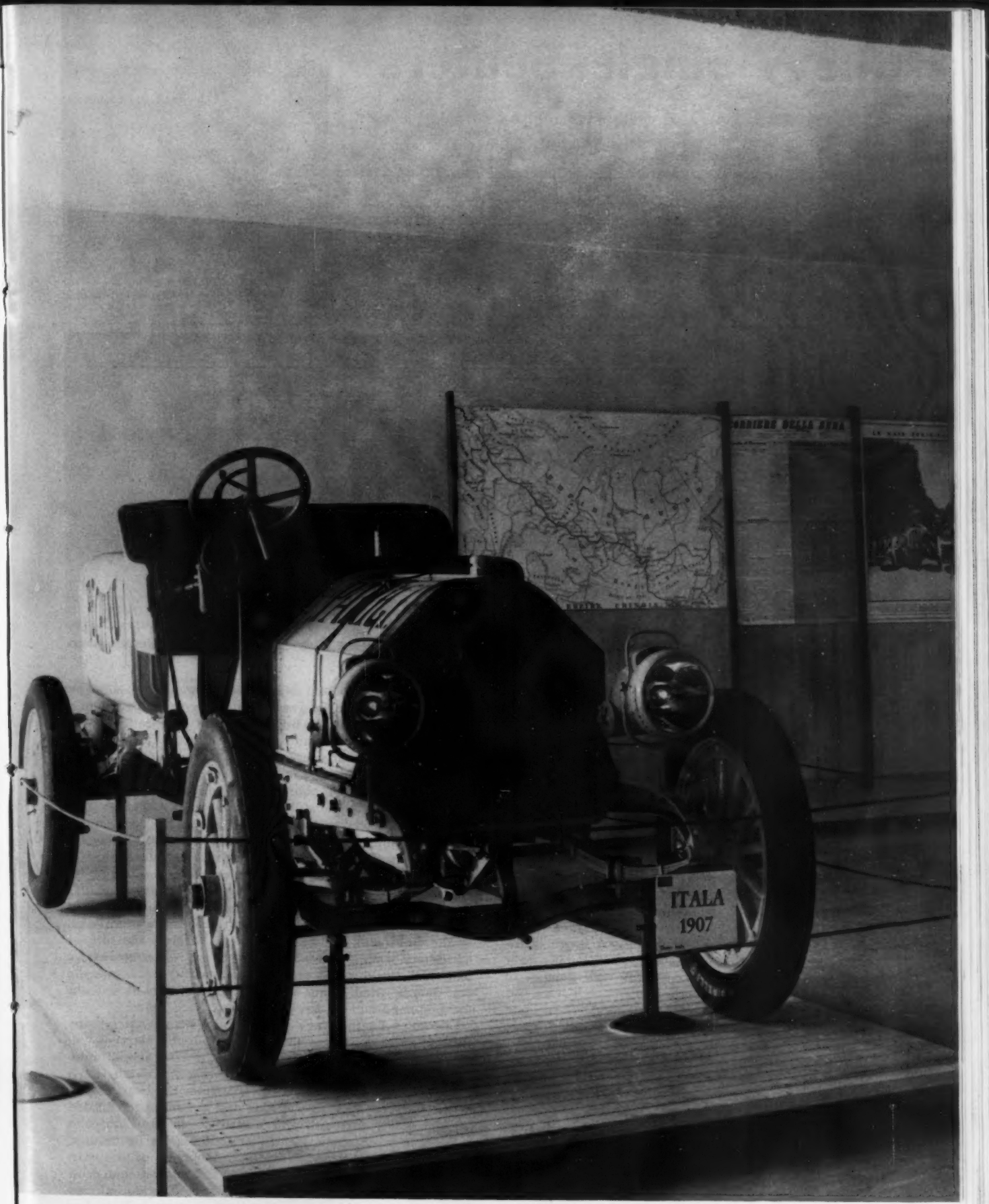
The sports section offers a mouth-watering array. At this end are the Lancia D50 and sports-type B24, and the Maserati 250F.



Augusto Monaco and Count Trossi built this 1935 front-drive special. Its radial engine has eight pairs of two-stroke cylinders, air-cooled and blown.

For more on this superb Gilera racing bike, see page 36. It's a transverse four tuned to deliver 55 bhp in the 1952 model shown.

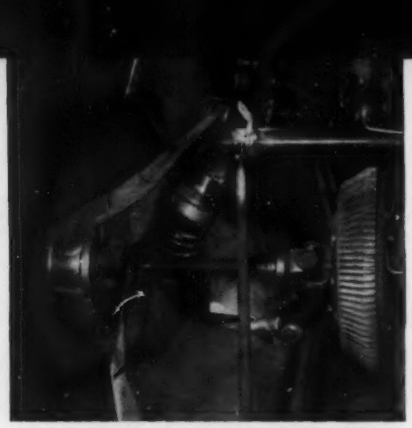




The Museum's atmosphere is captured in this study of the winner of 1907's epic race from Peking to Paris, a mere 10,000 miles.

Chevy Single-Seaters

The best way to start a racing Formula is to have the cars make the rules. Perhaps these two big-engined machines, independent creations of Zora Duntov and Bill Sadler, will bring back the drama of the Auto Union days.



Compare CERV-1 rear suspension with Cisitalia on page 53. Progressively-wound coil springs are used, with tubular shocks, at all wheels.

With Duntov in cockpit, Steve Petrasek checks the Firestones. Other onlookers: Ray Lavely and Sid Langsam of Continental Divide Raceways.

A Corvette-based radiator hides within the Sadler's low intake scoop. Body finish is excellent in view of the three-week construction period.

► We don't know why it's taken so long. In the March, 1959 SCI Steve Wilder ended his report on Bill Sadler's Mark 3 sports car with, ". . . if USAC should promote races for Chevy-engined single-seaters, he'll surely be one of the first to build one." It wasn't until 1960 that Steve was able to sit in the first Sadler bearing this description, at the Carling 300 Formula Libre, and the raceable rear-engined car shown here didn't appear until October, 1960. A month later the general public had its first dazzled look at Chevy's own effort in this direction: the CERV-1.

The first Free Formula Sadler was one of Bill's lovely little Formula Juniors into which a Chevy engine had been shoehorned and connected directly to the offset rear axle without benefit of either transmission or clutch. When you pushed the starter button, it started! In a trial at Harewood Steve Wilder found that the engine was rough below 3500 rpm and the overtaxed suspension was bumpy over 4000, leaving a narrow range of operation. Bill thought so too and abandoned that car.

Just three weeks before October's Watkins Glen Formula Libre, Peter Ryan and Bill Sadler were discussing Peter's lack of a machine suitable for this race. Thoughts turned to the first Chevy single-seater – then to the idea of a rear-engined, all-independent edition. With typically-Sadler speed such a car was designed and built and even trimmed and painted in the three weeks available.

Lack of time meant that lots of parts from Bill's former projects had to be used (usual Sadler technique anyway), including the disc brakes, wheels, wishbone front suspension, steering, Halibrand drive unit and the engine. This last was a much-used enlarged-displacement veteran with a three-carb manifold. One of the points Peter and Bill wanted to prove with this car was that a high-gear-only layout could work on a road course, so no gearbox was fitted; a major refinement over the first *monoposto* was the addition of a clutch. For this reason Bill looked for wide-range power instead of a high maximum, leading him to a Duntov cam and the stub exhaust stacks. He felt any tuned collector-pipe exhaust system had to have some engine speeds at which it worked better (or poorer) than others, so avoided the issue entirely with the stubs.

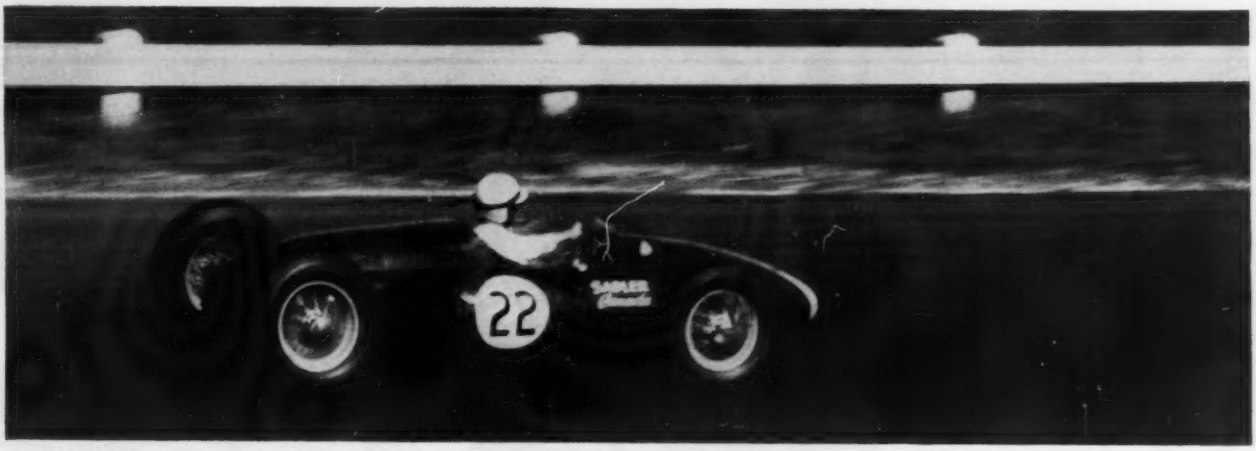
Since there was to be no time for testing, or even for much designing, the Sadler's tubular space frame was deliberately made oversturdy. Though largely empirical it turned out to be the stiffest frame Bill's ever made. It's terminated at the back by a rear suspension along Lola/Lotus lines, using the drive shafts as legs of wide-based upper "wishbones." A man-sized anti-roll bar was installed at the front end, because Bill likes a healthy measure of understeer, and because there was every reason to believe that this vehicle would oversteer without it. The result, the first time he tried it, was what Bill called "without a doubt the best-handling car I've ever built."

Chevrolet Engineering's CERV-1 also incorporates many parts from its sports car predecessors, but for different reasons. Zora Arkus-Duntov first started thinking about building a rear-engined racing car at Sebring in March, 1957, when he was being parboiled by heat from the front engine in the Corvette SS; this suffering and the measures needed to combat it seemed silly and a waste of time to Zora, who in his way is as practical and "let's-build-it" as Bill Sadler. Duntov's mental concepts crystallized on June 6 of that year, when the A.M.A. ban on competition fell and left him with a wide selection of components for Chevy competition cars and nothing legal to do with them. For years Zora has been interested in the Pike's Peak hill climb, harboring

CHITTENDEN

Dramatic styling of CERV-1 wowed spectators at Riverside, but is not likely to make a significant reduction in drag of this open-wheeled race car.

DOLIN



At Watkins Glen Formula Libre, only the Grand Prix cars were faster than Peter Ryan in the compact, high-gear-only single-seater by Bill Sadler.

(we surmise) an urge to own the absolute record for that challenging ascent, and we guess that whatever the long-term implications of CERV-1 are, the immediate goal is the Peak.

Stock displacement applies here too, with the option of any of a number of experimental Chevy blocks of iron or aluminum. The lightweight heads are used, fed by injection with ram pipes bigger and 25 percent longer than standard, capped by a rear-fed plenum chamber inside the Buck Rogers headrest. Exhaust pipes keep the 40-inch tuned length of the SS, emptying into big collector chambers. Little oil radiators to fit in the scoops beside the water radiator were included in the design, but never fitted since the air circulation in the engine room, aided by air supply ducts along each side, is sufficient to keep the engine oil cool on short runs.

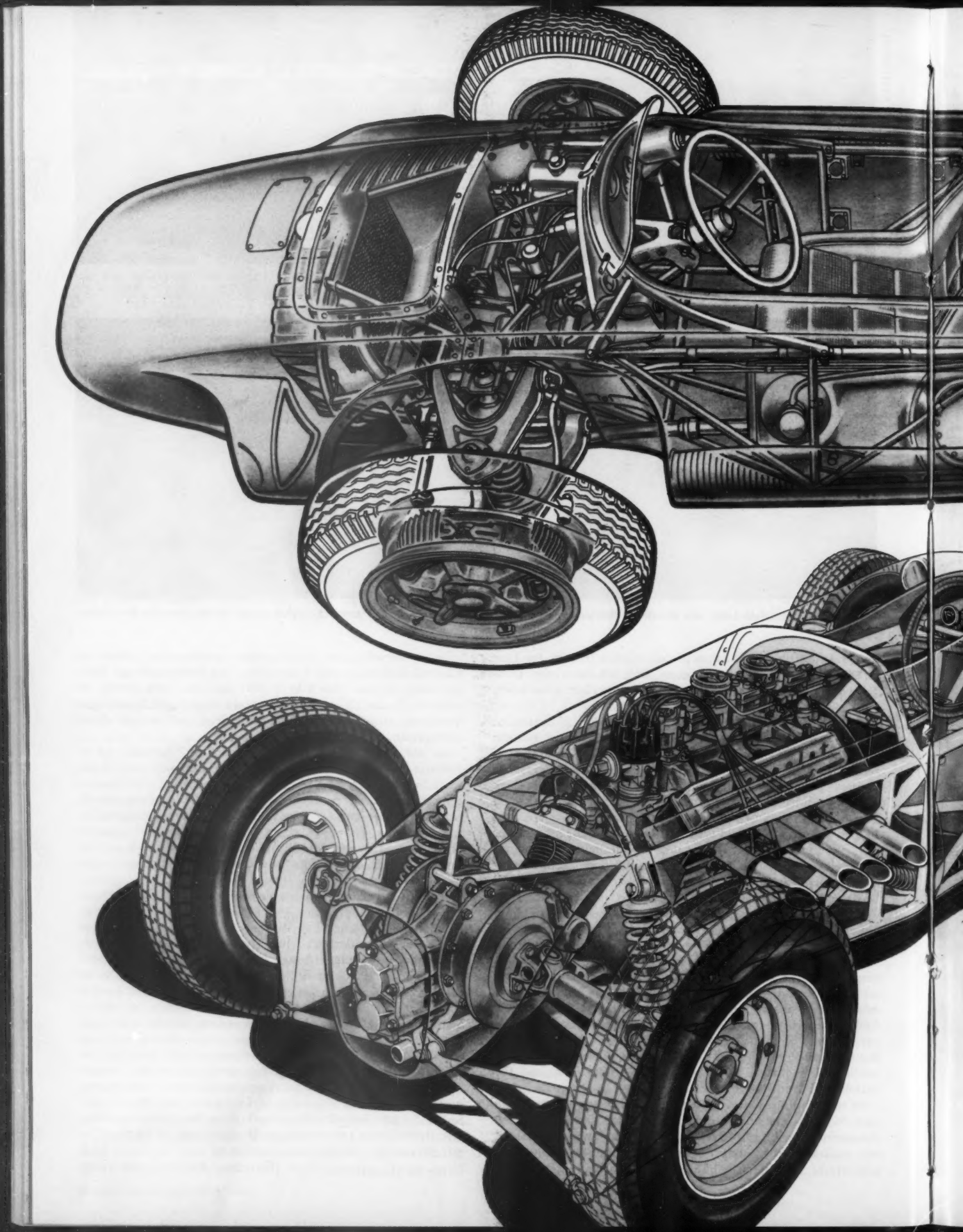
A magnesium bell housing mates the engine and the aluminum-cased SS Corvette transmission, remote-shifted by links from the right side of the cockpit. The Halibrand final drive is from the SS parts supply too, as is the whole front suspension, the steering and the wheels. The drum brakes are new, though, using Corvette mechanisms with sintered iron linings against bimetallic drums that are extensively finned and drilled. New also is the independent rear suspension, the geometry of which resembles nothing more than the Cisitalia-Porsche Type 360 described in this issue! As in the Sadler, the drive shafts are used as upper links and the rear brakes are inboard.

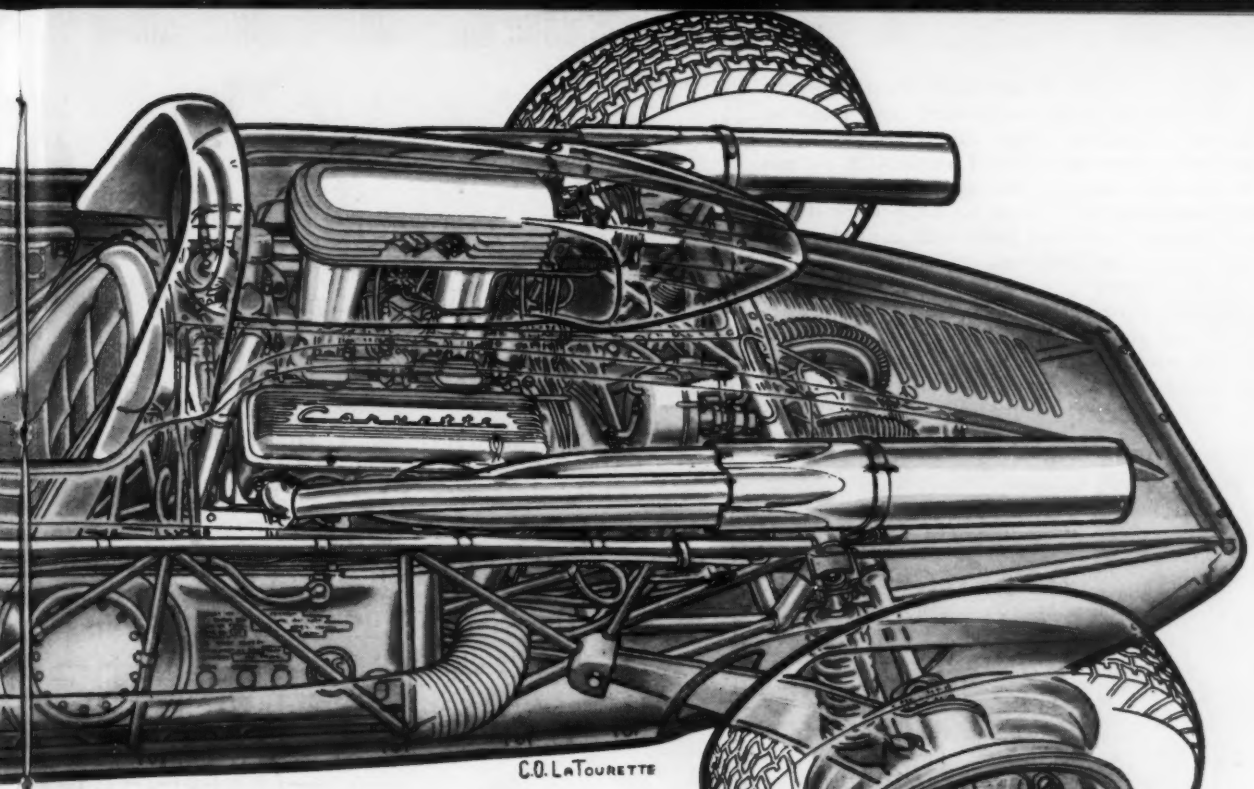
By developing a three-dimensional truss structure along each side of the 125-pound frame, Zora was able to use chrome-moly tubing of very small diameter. Inside these two trusses are the collapsible rubber fuel tanks with a total capacity of 20 gallons. (This figure alone is enough to discourage viewing this as a serious road racing effort by Chevrolet, Cooper and Lotus, who get better mileage from the Climax than this Chevy will deliver, carry nearly 40 gallons of gas.) The dramatic body shell is of lightweight fiberglass, as on the rebodied Sting Ray, and weighs about 80 pounds.

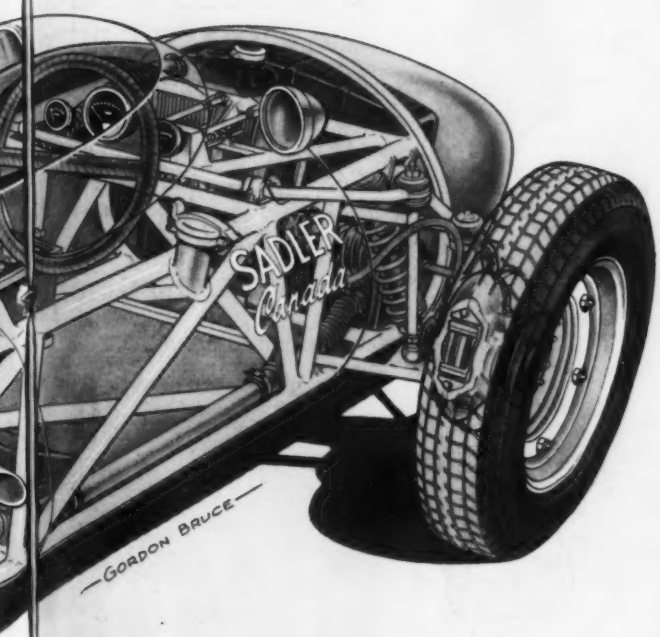
So far the CERV-1 has been run at Riverside, GM Proving Ground, Pike's Peak and Continental Divide Raceways, which is handy to the Peak and good for general testing. Zora's big problem so far has been getting enough rubber on the back wheels. He's tried everything including drag slicks – "They just come off in big chunks" – and is now running mammoth Firestones at the rear and smaller ones in front. The Sadler was fitted with Engleberts, also of contrasting size.

Interestingly, one man has driven both these cars: Stirling Moss. He felt the Sadler was rather basic, but praised its general roadholding. For his driving style he would have preferred less understeer (just trim that anti-roll bar, Bill) and quicker steering. Though he took it relatively easy with the CERV-1 at Riverside, Moss did feel there was "a lot more to it" than the Sadler. Obviously Moss could control these cars, but more provocative is that mere mortals – Sadler, Ryan, Duntov – have been able to handle with some ease a type of machine that was suggested several years ago for an "American Formula" and criticized then as being too powerful for its weight, hence too dangerous for the average competition driver. The next step could be a new *monoposto* Formula, or rear-engined Chevy-powered sports cars. Sadler, in fact, has already embarked on the latter step. He's already building two rear-engined sports cars to be raced in '61. Presumably they'll have gearboxes! —*KEL*

(*Cutaway drawings overleaf*)







SPECIFICATIONS

	CERV-1	SADLER
ENGINE:		
Displacement	283 cu in	301 cu in
Dimensions	3.875 x 3.00 in	4.00 x 3.00 in
Compression ratio	11.0 to one	11.0 to one
Power (SAE)	350 bhp @ 6500 rpm	300 bhp @ 6000 rpm
Fuel capacity	20 gallons	22½ gallons
CHASSIS:		
Wheelbase	96 in	91 in
Tread, F.R	56 in	50, 48 in
Overall length	172 in	136 in
Steering ratio	13.5 to one	14.0 to one
Turns, lock to lock	2.3	2.0
Anti-roll bar diameter	.69 in	.88 in
Tire size, front	6.70 x 15	5.50 x 15
rear	8.20 x 15	7.00 x 16
Weight, bare frame	125 lbs	80 lbs
Curb weight	1600 lbs	1330 lbs
Final drive ratio	3.42 to one	4.11 to one

Call it what you will, Cisitalia or Porsche Type 360, this ambitious Grand Prix machine frustrated countless engineers on two continents. They knew it would be vividly fast if they could only make it run — but they couldn't. Is it just coincidence that it's now back at Porsche, where another fantastic Grand Prix car is being built?

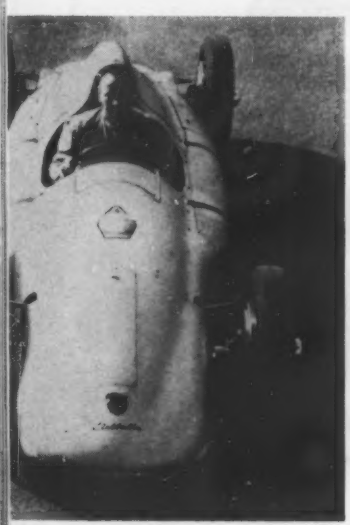
THE FANTASTIC GRAND PRIX CAR

by Gianni Ro

► This is the story of one of the most remarkable cars ever built. With its ingenious engineering and inspiring potential, it was a four-star flop. The Porsche-designed supercharged 1500 cc four-wheel-drive Cisitalia G.P. car was a washout. It was never successful because it was never raced. We can't help wondering what would have happened if . . .

This story, however, will not deal with conjecture; it will deal with the car, the men and the company. In the classic mode, it's a tragedy.

The Cisitalia saga started in 1945 in Turin. Piero Dusio, director general and co-owner of the Cisitalia factory, was producing a very successful racing car based on Fiat 1100 components. Discontent, he gave his attention to G.P. racing and looked for a designer. Late in 1946 he had drawn contracts with the experienced Porsche group which at that time had its headquarters in Gmünd, Austria. With the elder Porsche being held hostage in Dijon, France, a large part of the contract money was used to ransom him in 1947. His son, Ferry, and chief engineer Rabe quarterbacked the negotiations for the Porsche concern. Two others participated in the early talks. They were engineer Hruschka and Carlo Abarth. Hruschka had been serving as Porsche liaison in Italy, overseeing tractor production at another factory. Abarth, while not affiliated with the Porsche factory, knew several men there and may have served to introduce them to Dusio, aiding him in negotiations.



Piero Dusio sat behind the wheel for early publicity shots of his promotion, the Type 360 Porsche.

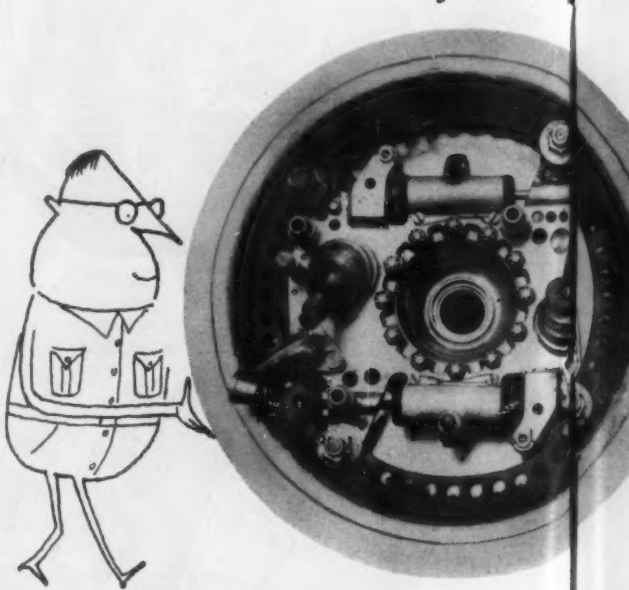
While Dusio gave top priority to the G.P. car, it was but one of four contracts between Cisitalia and Porsche. The others were for a 1500 cc sports car (Porsche Type 370), a tractor and a water turbine. Porsche was to handle the designing, Cisitalia the production.

The 1946 contracts called for first drawings of the G.P. car to be delivered to Dusio in the spring of 1947, with the first car to be built about September.

Details of the car included an opposed 12-cylinder engine with a 56 mm bore, a 50.5 mm stroke and a displacement of 1492.6 cc. A maximum of 10,000 rpm was aimed for, but initial performance was hoped to be 300 bhp at 8500 rpm. The engine had four overhead cams, two for each bank of six cylinders, driven by a system of shafts like today's Type 550. An 18 mm plug and two valves per cylinder were provided. The crank was a Hirth unit and dry-sump lubrication was used. Two vane-type blowers replaced the three Roots superchargers originally planned. They were driven at a reduction of 10:17, that is, 8500 engine rpm corresponded to 5000 for the blowers. The maximum boost was about 45 pounds. Two dual-throat Weber carburetors were mounted on the superchargers. Internally, the valves were at 90° to each other.

The four-wheel drive was planned to be engaged or disengaged at will by a lever under the steering wheel and was intended to increase traction during acceleration. With a weight-to-power ratio of 4.5 to 1, the Cissie needed all the traction it could get. The 4 w.d., rare in race car construction because of its added weight and reputed poor handling, was but one of the unusual features of the car.

(*Continued overleaf*)



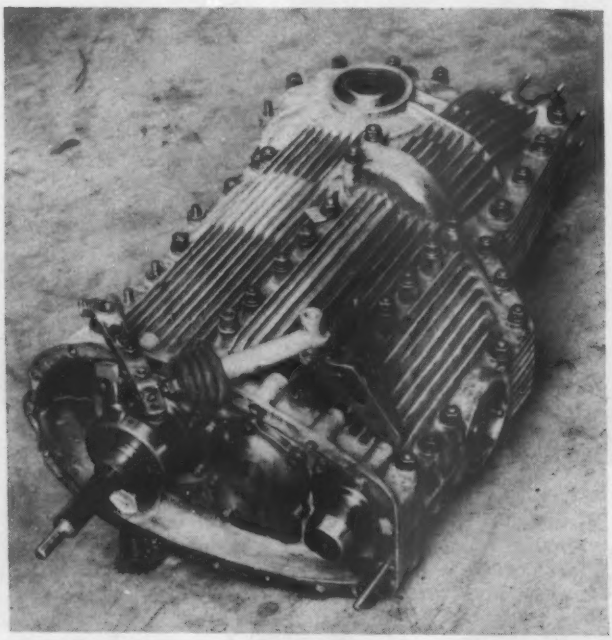
MOST
STIC
PRIX

Rogliatti

Other interesting details included the very accurate and intricate alloy castings of the blocks and heads, and fitting of wet cylinder sleeves without gaskets.

Use of the rear-mounted engine reflects experience the Porsche team gained in the 1934-1937 Auto Union, which was reasonably successful. In the Cisitalia, contrary to the Auto Union and the arrangement on the later Porsche Spyder, not only the engine and clutch, but also the transmission was mounted ahead of the rear wheels, so that the rear wheels were actually at the rear end of the car.

The five-speed transmission was progressive, requiring drivers to use the gears in sequence; i.e., the driver could not shift, say, directly from second to fourth. It represented the first use of the Porsche servo synchronizing ring, but because of the progressive shift, the ring assembly had to be small and thus was not too powerful in action. Only two rings were needed, one for upshifts and the other for downshifts. Shifting was much like a motorcycle's: pushing the lever ahead shifted up and pulling back, the opposite. Lotus, of course, uses the same principle today. First plans included the possibility of either hand or foot shifting.



PHOTOGRAPHY: WEITMANN

Beautifully-finned gearbox unit is viewed from front. Splined shaft is input from engine; shaft at right (bottom of box) drives front wheels.

In the front the traditional Porsche trailing arm suspension, with torsion bars, left room for the front-drive shafts and the constant-velocity joints used at the outboard ends only. Torsion bars were also used at the rear, but the suspension geometry – like the genuine space frame and the effective use of a rear engine – was about 15 years ahead of its time. Each rear hub was located fore-and-aft by a very long trailing radius arm, and was located laterally by a pair of parallel arms that produced a very low roll center and eliminated the drastic camber changes that had affected Porsche swing-axle layouts, without going to the weight and complication of a de Dion axle. Certainly this suspension would have made the 360 the first rear-engined G.P. car with completely satisfactory, highly-usable handling.

A carryover from the 1938-39 Auto Union was the use of four leading shoes within each brake drum, the diameter being smaller at 13¼ inches but the width being greater at 2.15 inches. The backing plates carried air scoops, especially large ones at the rear. Track was set at 50.7 inches both front and rear, and wheelbase was 101.4 inches – long even by 1948 standards. Without fuel and oil the car weighed 1580 pounds, with a front/rear distribution of 48/52. When the centrally located fuel tanks received their 44-gallon load, the distribution became exactly 50/50.

Von Eberhorst, former professor at the Dresden College of Technology, joined the Porsche group in the spring of 1947 to serve as an advisor. He and his wife had fled from East Germany to Austria with virtually no possessions. His talent was warmly received by the Porsche group since he was the only immediate source for data on the 1938-39 Auto Unions and their high-pressure supercharger techniques. It was he who supported strongly the controversial four-wheel drive. He argued successfully that its complexity and weight were overshadowed by its tractive advantages. His clinching argument in favor of 4 w.d. over a two-wheel-drive version was in plotting anticipated performance over one kilometer with a standing start. The 4 w.d. car was expected to cover the distance at a speed of 117 to 119 mph while a similar car with rear-wheel drive only would do it in 107 to 113. The then-current world record for the distance, set by Rosemeyer in a six-liter Auto Union, stood at 117.9. And von Eberhorst pointed out the traction advantage of four-wheel drive increased as the track became slippery.

While one-cylinder engine testing had revised the power unit's output upward to 450 bhp at 10,500 rpm, Cisitalia had no dynamometer big enough to handle the full-scale engine. A second-hand test stand bought from Fiat was used for break-in and partial-load testing, but no flat-out readings were obtained.

Dusio, meanwhile, abandoned hopes of seeing the Cisitalia G.P. car in action by the spring of 1948. He also overestimated his financial resources and underestimated the high material and labor investments needed for production of six cars, the figure he and Ferry Porsche agreed was needed to field a complete stable. Early reports appeared in the Italian press that the first car was almost complete when such was not the case. The financial troubles grew worse through 1948 when Dusio began negotiations with parties in Argentina. Government-subsidized Autoar assumed in 1949 the financial obligations of suit-besieged Cisitalia. In addition to creditors' suits of about $350,000, the 400 employees sued for $37,000 in back wages. Despite assurances by now-deposed dictator Juan Peron that the Argentine government would back the G.P. enterprise, cash was slow in coming and it was about a year before operations were finally shifted to South America.

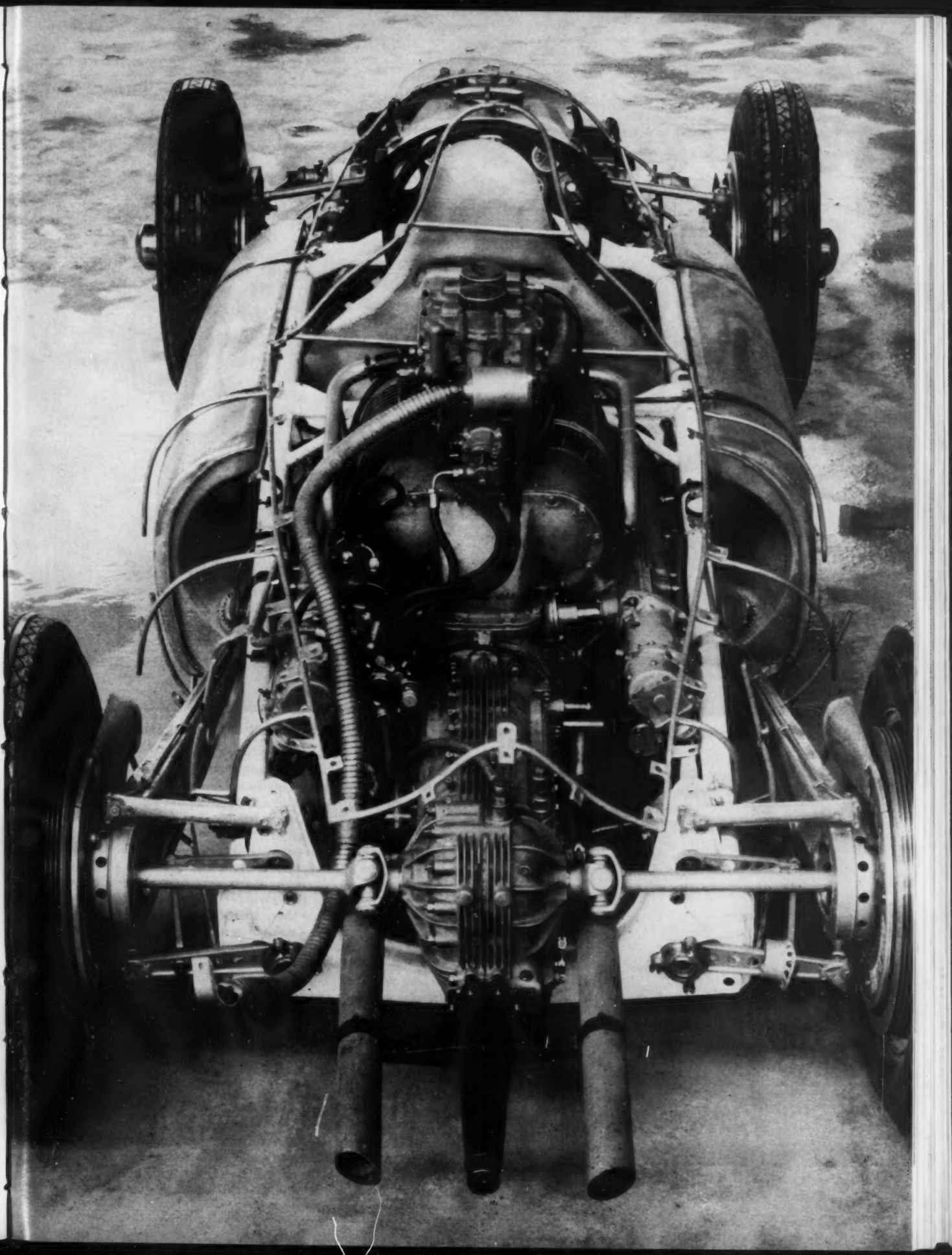
Porsche all but abandoned the project at that time since it was in the process of moving to Germany and setting up production of the Type 356. Prior to this, photos appeared showing Nuvolari at the wheel of a Cisitalia G.P. car, but that was apparently done for publicity purposes since, although the first car had been delivered, it had never been driven. In the spring of 1950, instead of six cars as ordered, there was one complete car, a second almost ready and only some parts for cars three to six – not enough to build a complete car.

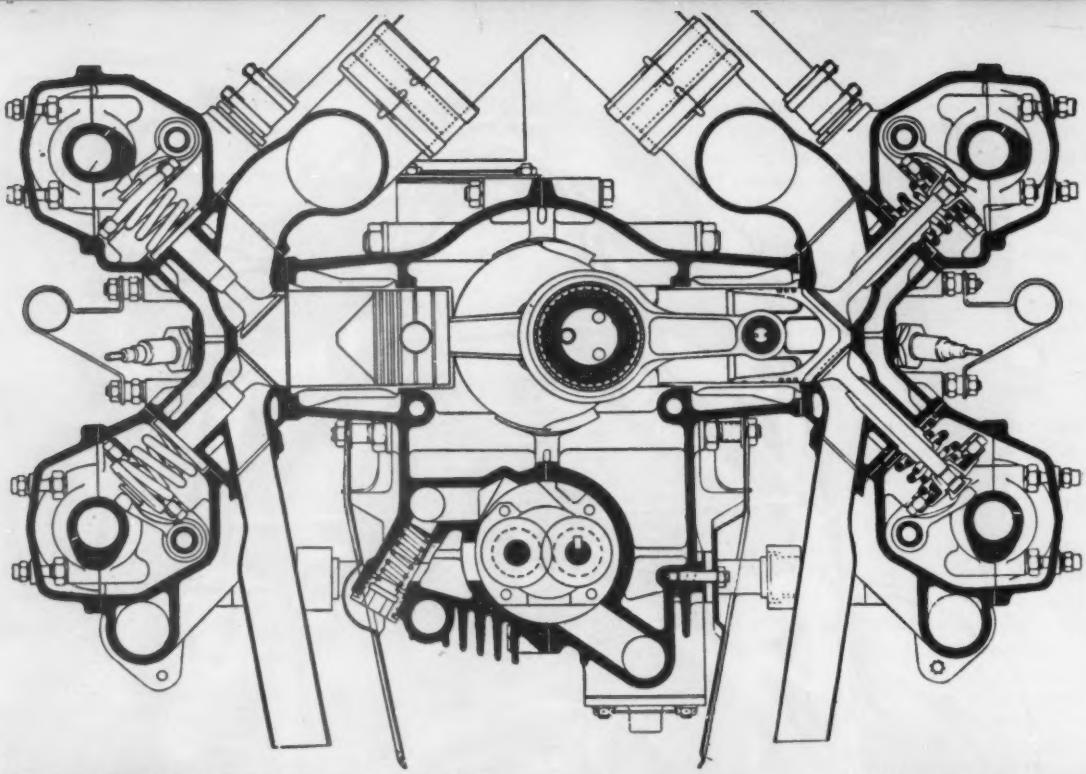
Autoar ultimately involved itself in assembling station wagons and the G.P. car gathered dust in a warehouse. In mid-1952, someone remembered the machine and launched a campaign to have it cleaned, tested and, if possible, raced at the new Buenos Aires track the following January. What followed was a struggle against lack of funds, lack of time and lack of counsel with the result that a perfectly good car was ultimately discarded and later sold at auction.

Engineer Martinez de Vedia, chief professor at the Buenos Aires College of Engineering, in the department of thermal

(Continued overleaf)

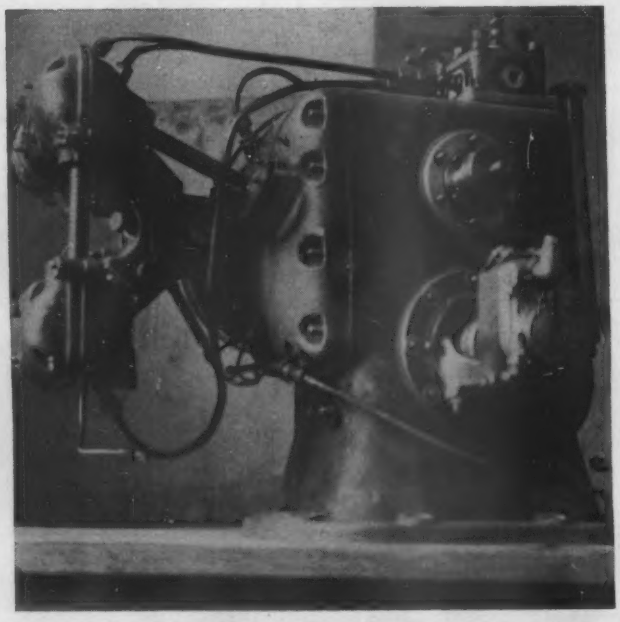
Cisitalia's rear suspension, fully independent with near-parallel arms, was very advanced. Two big superchargers dominate top of flat engine.





ALVAREZ

The only public appearance of this most fantastic Grand Prix car was anything but impressive, though drivers did comment on its excellent handling.



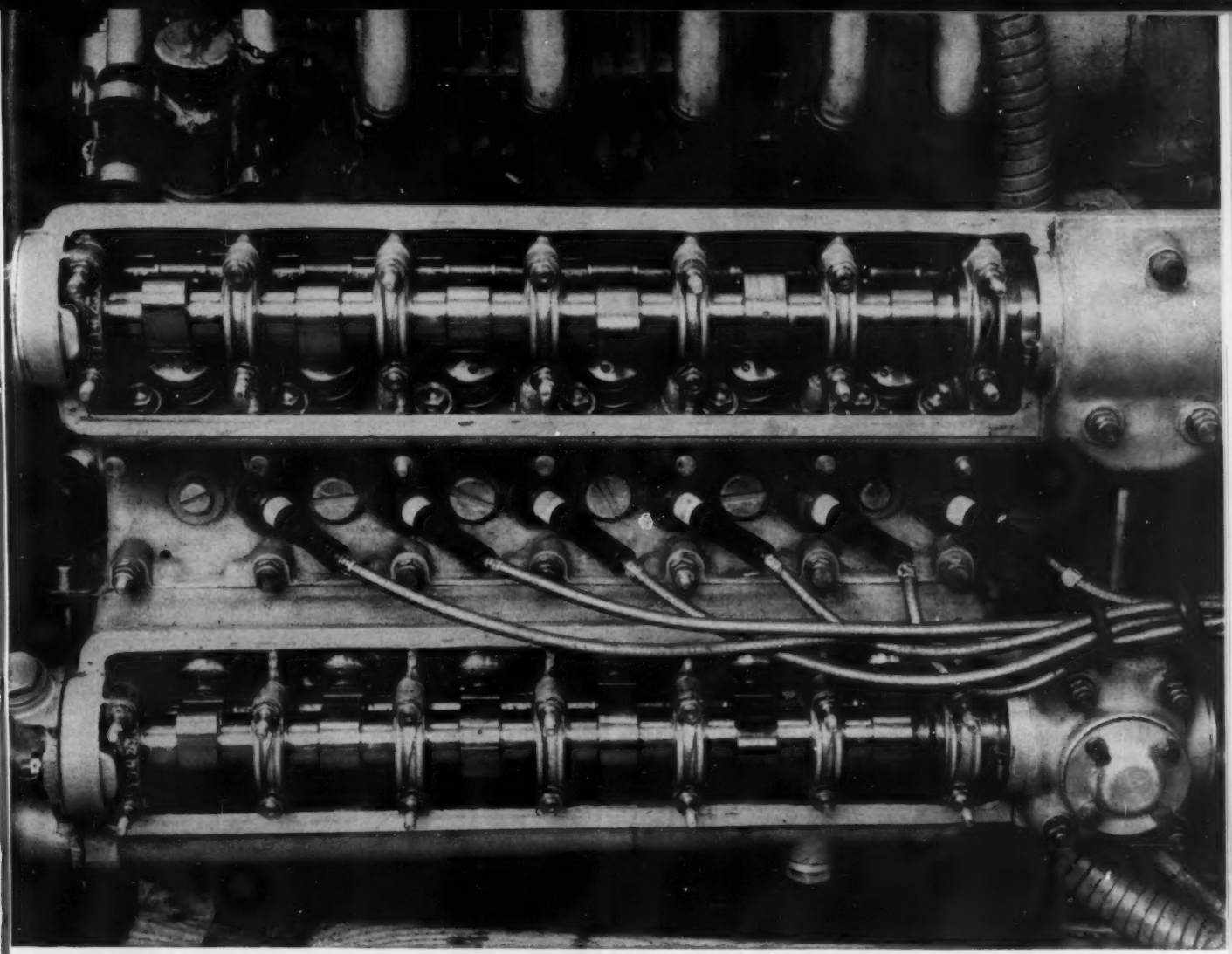
Single-cylinder test engine aided Argentine experimenters. Multiple pipe arrangement allowed precise metering of oil supply to valve gear.

machines, looked over the hundreds of drawings and began experiments with the single-cylinder test engine. Soon work began on the car with Clemar Bucci as the projected driver and his brother Roland as mechanic. But this venture ended after an argument with the Autoar management and the Italian engineer Giovanni Rossi took over while January, 1953 and the race rapidly approached.

The engine was put on a test stand, started easily and ran smoothly. Given full throttle for the first time, it gave a reading of 385 bhp — more than four bhp per cubic inch — at 10,000 rpm. The car was hastily assembled and taken to the autodrome for testing three days before the race. At first, the vane-type fuel pump refused to work at low revs. In the first few laps driven by Bucci and Bonetto, the drivers were astonished at the phenomenal road-holding. At a relatively low rpm, and using two-wheel drive, the car turned in a time of 2:30 for one lap, comparing favorably with a best time of 2:22 made by Ascari on a 4.5 Ferrari.

It has been said the four-wheel drive did not work well. It was, in fact, easy to use, but the identical drive ratio in the two differentials was difficult to achieve since the car used different tire sizes front and rear.

Joy over the performance lasted but a few minutes for, after a couple of laps, the car went by in a smoke screen. The trouble was traced to oil foam from the crankcase vent dripping on the hot manifold. It was subsequently discovered that the two oil scavenging pumps were extracting



Left-hand cylinder head of flat-twelve displays wide cam lobes and finger followers. Spark plugs (Champions fitted here!) thread in at steep angle.

oil slower than the main pump was delivering it to the engine. Since it was not possible to change the pumps or the drive ratio, the problem was temporarily solved by using a flexible pipe to lead the oil away from the exhaust pipe. It was also evident that using straight methanol for fuel was not what Porsche had in mind. Persistent carburetion problems ended in several burned pistons.

The engine was torn down and rebuilt. This time it showed 416 bhp on the dyno, a very respectable figure considering the dearth of facilities and absolute lack of advice the men had to go on, not to mention the scarcity of cash they had to work with as Autoar was all but uninterested in the project.

It was decided that rather than try to race the car, an attempt would be made at record-breaking. They felt that if the runs were successful, the car could be sold and Autoar would reap publicity value. Under pressure from the company's directors, the car was readied by removing the front drive, lightening the car by a couple of hundred pounds.

After some false starts, on the cold morning of June 18, 1953, the Cisitalia made its last runs. The Buenos Aires winter is damp, cold and windy and the engine, fed with straight methanol, wouldn't warm up since the oil kept flooding the crankcase and fouling the spark plugs. At 7000 rpm, the highest speed was 147 mph; at a full 10,000 it should have been at least 210. The tests were stopped, an argument arose among members of the management and the car was sold for peanuts to someone who didn't try to use it at all. It was at this time that the specifications for Formula 1 were being changed and the car was outdated even before it had a chance. Bonetto, after his drive at the autodrome, had recommended building an unblown 2.5-liter version with two-wheel drive, but this was never attempted.

This then is the sad saga of the Cisitalia, the potential winner that never got the green flag. It's the story of missed opportunity, of people who had possession of the most advanced car of its time and for several reasons couldn't or wouldn't use it. The car lay for some time in a garage near Buenos Aires. All it needed to make it run properly was the proper fuel blend and an insight into the problem of the oil pumps. The suspension, steering and braking and generally the whole car were perfect right from the start. The Bucci brothers still get excited when they remember "the car" and sadly recall they were denied permission to carry on tests of their own.

The Cisitalia G.P. car has been returned to the Porsche works where it is now being repaired for a museum. Perhaps someone could be spared from more mundane matters to do a little internal work on the Cissie and, if successful, the factory could stage dramatic demonstration runs similar to those made not so long ago with the pre-war Mercedes. It's likely they'd show that the Type 360's performance is as far ahead of its time as its very advanced design.—*GR*

In France, where technical variety is the staff of life, Citroens provide the spice.

CITROËN Station Wagon

► No matter how you slice it, the Citroën company makes cars that are *different*. It's a tradition with them, ever since they sprang front-wheel drive on the startled French public in 1934. Well, even before that; they introduced all-steel bodies in 1925 and . . . but why bother with the details of the past? Today they claim to be building the car of the future, and with good reason.

First off, the Citroën looks different. Its nose looks more like a Bonneville record-breaker's than an ordinary station wagon's. But then it's not an ordinary station wagon, so why should it look ordinary? Though no speed demon, its adroit streamlining cuts drag and therefore gas consumption at everyday highway speeds.

Getting in the Citroën is different too. The doors swing open quite far to a detent, and if you pull further they open up really wide, as if at the dentist's. There's a substantial rail to step over, but once past it you find that the floor is very low yet the seat is comfortably high. It puts you in an erect position that lets you drive for hours on end without unnecessary fatigue. Unlike the sedans, the wagon has a bench-type seat in front to increase the passenger capacity. Its drawback is that the driver finds the car corners better than he does and he has to hang on to the wheel.

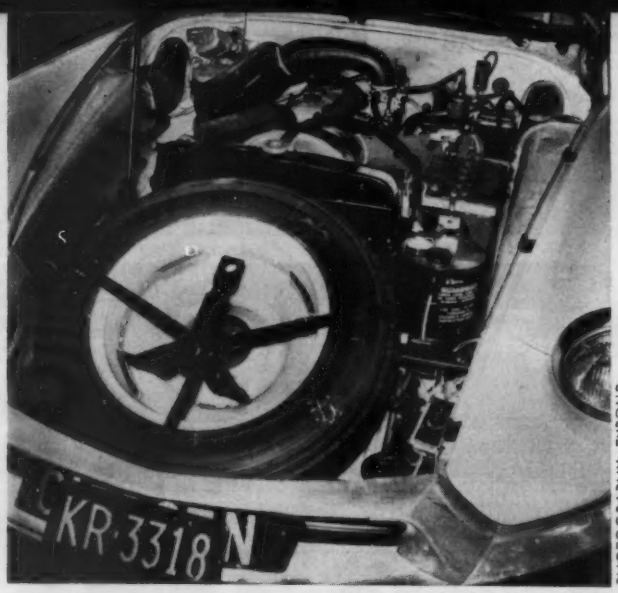
Anyway, now you're sitting in it, look around. Did you ever see such visibility? You sit up erect, and the view is panoramic. The picture windows run right up to the high roofline while the sills are equally low. Best of all are the tiny, slim windshield posts, only 1¾ inches wide. Augmenting this visual virtue is another; there are no wind-wings, hence no "secondary" windshield posts. The effect is that of being in the control tower at an airport; *you* are in control because *you* can see what's going on.

Worried about ventilation? Don't bother. At both ends of the dashboard are controllable louvers which direct air (hot, cold or various mediums) at you (the driver) and your passenger nearest the door. An extra flap can open down to blast the air straight in your face.

The Citroën's steering wheel is now famous for having but one spoke and at that it is sharply curved into the column itself. The single attachment makes the wheel itself more flexible and in this case safer. We thought the serrations on the wheel rim were uncomfortable, spoiling the advantage of its ample thickness.

The French cars which come to this country always charm us because they place so many controls at your fingertips, most of which work in quite unusual fashion. The Citroën station wagon is no exception. The turn indicator lever is self-centering but you turn the signal off by pulling the lever *toward* yourself. To please the vintage-minded there is a hand choke, but topping that is a spark control! If you get stuck with some cheap gas that makes the engine ping, just retard the spark till it stops pinging. And when you get to the top of that long grade, advance it again for part-throttle cruising. Using this trick, you can probably run all the time on "cheapie" gas, though regular gas from well-known pumps in this country is now so good that the Citroën thrived on it no matter how advanced we twisted up the spark.

The starter is not operated by turning the key, but by pressing a red button about one inch away. This is an excellent feature; if you've not run the car for a long time, you can turn the engine over with the starter in order to pump some oil around before starting. On cold days the hand choke was necessary to start and, for the first few moments, to keep the engine running.



PHOTOGRAPHY: TYPOND

Spare tire, cradling prop for automatic wheel jacking, dominates front view of engine compartment. Canister on right contains hydraulic fluid.

Testers to the rear! Two of C/D's intrepid road researchers try the small transverse jump seats and the Citroen wagon's swing-up rear door.

Opposite the turn indicator on the steering column is the combined horn-headlight-dipswitch. Pushing in on the end works the horn. Twisting the same knob, there are three positions: off, parking/low, and high/low. In the latter cases, it depends whether the lever is pushed toward the dash or pulled away from it.

While the dashboard is entirely of plastic, as on most French cars, it is both modern and handsome. One little touch nicely exploits the scope of this material: the shift pattern is embossed on the dash just in front of the column shift lever. (Reverse is down and alongside fourth; the rest is conventional.)

Dash padding is used both on the top of the dash as is now usual and also in a knee rail along the bottom edge, though both could usefully be firmer.

The best two controls we've saved for the last. You may be used to cars with no clutch pedal but how about one with no brake pedal? All the Citroën has is a little push button. They've taken the concept of power brakes to the ultimate, providing a control that (*Continued on page 90*)

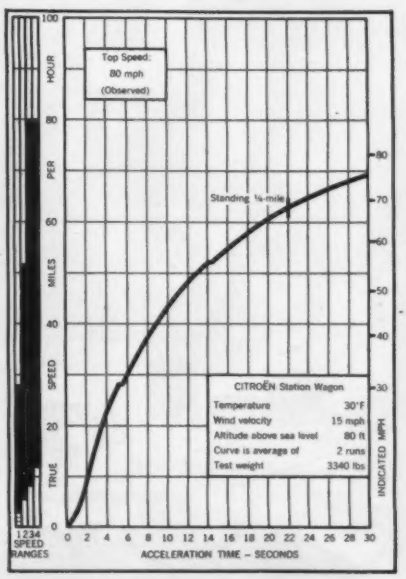
Like front-wheel drive, short overhangs are a Citroen tradition. ("A wheel at each corner.") The appearance, like the proportions, is also distinctive.

ROAD TEST

CITROEN Station Wagon

Price as tested: $3440 delivered (with heater)

Importer: Citroen Cars Corporation
121 West 50th Street
New York 20, N. Y.
and 8423 Wilshire Blvd.
Beverly Hills, Calif.


Top Speed:
80 mph
(Observed)
Standing ¼-mile
CITROËN Station Wagon
Temperature 30°F
Wind velocity 15 mph
Altitude above sea level 80 ft
Curve is average of 2 runs
Test weight 3340 lbs
TRUE SPEED MILES PER HOUR
INDICATED MPH
1234 SPEED RANGES
ACCELERATION TIME – SECONDS
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
0 20 30 40 50 60 70 80 100

ENGINE:

Displacement	117 cu in, 1911 cc
Dimensions	Four cyl, 3.07 in bore, 3.94 in stroke
Valve gear	pushrod overhead valves
Compression ratio	7.5 to one
Power (SAE)	70 bhp @ 4500 rpm
Torque	98 lb-ft @ 2500 rpm
Usable range of engine speeds	500-5000 rpm
Corrected piston speed @ 4500 rpm	2615 fpm
Fuel recommended	Regular
Mileage	19-34 mpg
Range on 17.2 gallon tank	330-590 miles

CHASSIS:

Wheelbase	123.0 in
Tread	F 59.0, R 51.2 in
Length	195.8 in
Ground clearance:	varies from 3.9 to 11.2 in; normally 7.5 in
Suspension:	F, ind., two control arms, air-oil "spring", anti-roll bar; R, ind., trailing arm, air-oil "spring", anti-roll bar.
Turns, lock to lock	4
Turning circle diameter between curbs	37½ ft
Tire and rim size	165 x 400 (both)
Pressure recommended	F 27, R 28 psi
Brakes: type, swept area:	Power, F 11.6 in discs, R 10 in drum; 338 sq in
Curb weight (full tank)	3030 lbs
Percentage on driving wheels	62%

DRIVE TRAIN:

Gear	Synchro?	Ratio	Step	Overall	Mph per 1000 rpm
Rev	No	3.81		14.82	–5.2
1st	No	3.55	88%	13.79	5.6
2nd	Yes	1.89	54%	7.35	10.4
3rd	Yes	1.23	44%	4.77	16.0
4th	Yes	0.85		3.31	23.2

Final Drive Ratio: 3.89 to one.

Road Research Report: AUSTIN-HEALEY SPRITE

► If you've passed the P-R-N-D-L stage of driving and are interested in sports cars, there's probably no better starting place than an Austin-Healey Sprite. It is far and away the cheapest sports car that is readily available with nationwide service and parts distribution to back it. It has the further advantage that it is a genuine sports car and not a four-wheel motorcycle. Whatever you learn about sports cars while apprenticed to a Sprite will serve you in good stead when you graduate to something larger and faster.

While no car will ever be a genuine successor to the MG TC, the Sprite comes the closest and that is how it should be. After all, Donald Healey designed it by exactly the same principles that had governed the MG Car Company, namely, to build a good sports car to a sensible price by clever, simple design and, wherever possible, components already proven by and tooled up for existing sedans within the parent company.

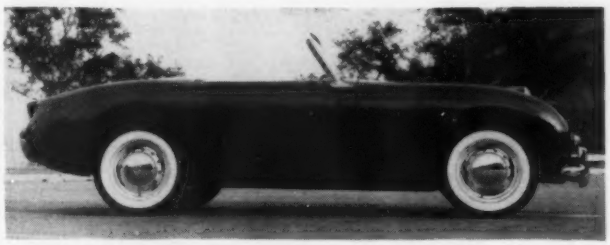
COCKPIT CAPERS

Because the Sprite has an integral body-frame, the cockpit is far more spacious than the car's size would indicate. The doors are good-sized but access is made somewhat awkward because the door-latch's pin can catch on your coat pocket (and will if you don't watch out). The bucket seats, the real kind with simply curved wrap-around backs that are hardly upholstered at all, get a good grip on you and won't let you fall out. The seat cushions, while not overstuffed, were comfortable enough. They would have been better if they'd been tilted up at the front. We found we kept hitching ourselves back in the seat every few minutes.

All the controls are well placed, especially the stubby little shift lever which sprouts from the deeply curved metal transmission cover. One of those old-fashioned suction-cup-style ash trays would be a useful accessory for someone to revive; it would stick easily to that bulge and be handy to both driver and passenger. The starter pull seemed awkward, being nearly in front of the passenger, because the choke was also to the right of the steering column (and with too tight a spring to stay out by itself).

With an only 80-inch wheelbase and springs stiff enough for sporting driving through the bends, the Sprite has an understandably jiggly ride. On long undulating dips, the effect is that of a small sailboat in a following sea. Spring rates, for the technically minded, are 71 pounds per inch front and 98 rear.

Though short on ride comfort, the little Sprite's roadholding is as tenacious as its tires allow. The car is very low to the ground so it rolls but little and doesn't transfer too much weight to the usually overworked ouside tires. Combine this with its quick-as-a-wink steering and the Sprite is sheer joy to tool through ess-bends on smooth, lightly-traveled roads.



Being a small car, it's natural that its living quarters should be a bit on the cramped side. Most of our staff always left the seat in the fully-rearward position and its range is only 3 inches.

WEATHERPROOFING

In this respect the Sprite is a far cry indeed from the TC and TD. True, it has side-curtains rather than roll-up windows, but they have sliding panes which permit hand signaling from the inside (and door opening from the out). Made of plastic, these panes scratch quickly and become difficult to see through unless cared for with loving tenderness and soft, clean rags. They slide reluctantly in felt-lined aluminum frames which clamp to the doors with knurled nuts. In a sleet storm, of course, you may be temporarily locked out since the door handles are only on the inside. (Unfasten the top's nearby buttons and reach way in.) A following wind will drive rain in through the gap but in practice this is no problem as the rain water runs down the front, fixed pane onto the body-contour surface of the door, then seeps under the fabric draft-excluder which surrounds the aluminum frame.

When the Sprite was introduced the folding top attached across the top of the windshield with a row of "lift the dot" fasteners. Since the fabric itself was unstiffened, it tended to develop a severe case of gaposis between the "dots" and the interior was considered to be rather a shower. Now redesigned, the front edge of the top is reinforced and hooks over a narrow flange all across the front, having but two fasteners, one at each corner.

When the top and the side curtains are in place, Sprite riders, snug in their draft-free quarters, have

another advantage over the old-timers: that very standard option, the $50 heater/defroster. It's a simple device; there's only one switch, either twist for blower-on or pull for ducts-open (through the heater, of course), plus the two small flaps above the transmission tunnel which, if closed, direct all the air on the windshield. Open, the warm air blows right on your ankles. When the temperature is in the twenties, you start getting warm air within a couple of blocks even though the engine is still demanding a rich mixture.

In summertime, Sprites are a rarity among front-engined sports cars in that the cockpit *can* be kept cool and well ventilated. The same fresh air duct which warms you in winter is used but the hot water from the engine is, of course, turned off by an under-hood tap.

FOLDING THE TOP

In fine old British sports car tradition, hiding the "rain-rag", an unfair euphemism these days, is a time-consuming chore. It's easiest to describe the process by telling how the top is erected first.

We've mentioned the flange across the upper edge of the windshield. There are also two hooks on the rear deck and a half-dozen fasteners. After all these items are hooked up, the spring-loaded tensioners (!) in the tubular steel, hoop-like framework are released, popping the center portion of the top up to its full height. Removing the top is, as the owner's manual details, merely "a reversal of the above steps."

After the fabric top with the wide rear window is rolled up and stowed behind the seats, the "hoop" is lifted out and the forward-reaching "zig-zags" are collapsed. Then the whole assembly is turned around and inserted in a second pair of holes, low down near the floor, and pressed under the rear lip of the cockpit edge. A small leather strap retains it there, out of the way.

It may be a struggle, but what joy it is to drive in the open air again. For us, the Sprite was the first open car after too many weeks of snow and cold and overheated buildings and claustrophobic cars. Of course we left the heater on full-bore and the side-screens were in place, and boy, did our noses and ears get red, but we loved every moment of it. There were a few well-wrapped people in stuffy sedans who may have stared but that just made us enjoy it more.

Logic-minded types may balk at paying more for a Sprite than an equivalently hopped-up sedan such as a Minor or 850 which carries twice as many people and does other such useful tasks, but what use is logic against the appeal of the open air and the open road? Perhaps you do have to be nuts to want to drive around with the top down and catch pneumonia, but if it happens you *are* nuts that way, it's hard to see what keeps you from buying a Sprite.

LIDLESS TRUNK

Both seats fold forward to give access to the luggage space. To stiffen the integral body-frame structure and to economize, there is no external lid. Although it's hardly easy to get at, Sprite owners soon become adept at reaching in there. They learn several valuable lessons. There is a great deal of room there, probably twice as much as you'd have if there were a proper trunk with a floor over the spare tire. You should avoid hurling sturdy suitcases in with excessive vigor, otherwise you may make an inside-out dent! For that reason and because the trunk is so irregularly shaped, soft canvas tote bags are the preferred luggage pieces, no matter how big or small. It is also an excellent idea to wipe off the spare before replacing it.

LIGHT, QUICK STEERING

One of the favorite delights of sports car owners is their car's agility, its ability to change course instantly or to swerve abruptly to avoid an unexpected obstacle. The Sprite has this in spades. Its steering is the quickest we've ever tested on our 400-foot Test Circle. At 50 mph indicated, the limit of adhesion, the one-eighth of a turn of lock required (45°) is less than many cars require at only 10 mph. In fact, it is equal to the amount of free play allowed by some states in their vehicle inspection criteria!

Nearly all driving can be done without removing your hands from a fixed position on the rim. Because the Sprite's overall dimensions are so small, the car is thus exceedingly nimble in traffic. In highway maneuvers there is no delay; you turn the wheel and the Sprite turns right now. For those accustomed to slower steering (it's only 2½ turns lock to lock for a 30-foot turning circle), the Sprite seems a little "nervous" and takes some getting used to. On icy roads and on the race track, this is especially true, as extensive swinging of the arms is just what the doctor didn't order.

Because of this quickness, if you grip the wheel too firmly, the very motions of your body as the car reacts to bumps in the road will affect the steering. If you take care to hold the rim very lightly, letting it jiggle through your hands when the bumps feed back, your Sprite will maintain a steadier course and hold the road better on bumpy bends. A gentle grip also discourages over-controlling.

CIRCLE TESTING

While the Test Circle's steady-state results indicate a very mildly understeering car, transient conditions such as entering a turn or abruptly straightening out indicate that there is very little in-built directional stability. When you toss her into a turn violently, the Sprite's tail end may snap around to embarrass you. While the quick steering is an asset beyond doubt in giving you the means to recover from the resultant sideslip, we are inclined to believe that its too-quickness is what tempts or leads you to over-control in the first place. The optional anti-roll bar ($34 — a bit steep) will have the dynamic effect of slowing the steering and increasing the understeer. It would also reduce the tendency to lift the inside rear wheel when accelerating out of a tight turn.

While we hesitate to say that the Sprite's steering is too quick, we certainly wouldn't want to drive on

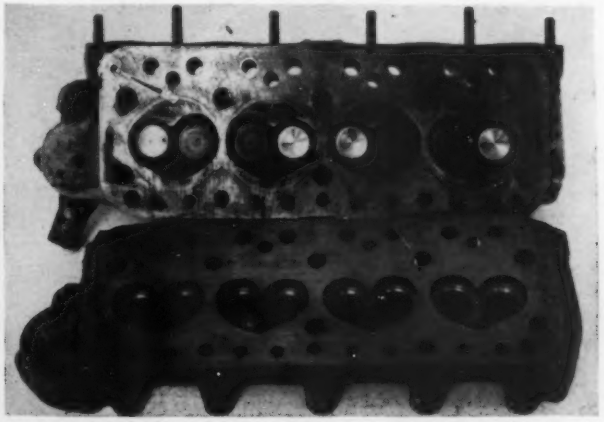
(Text continued on page 81; data overleaf)

For a lot of sportiness with the minimum of fuss and bother at your local bank, the Sprite's charms are proving irresistible to more and more Americans. Demand exceeds supply, even after three years.

Sprite's lidless trunk is unusual enough but how about these bumper guards without bumpers?

PHOTOGRAPHY: CHITTENDEN

Out of a vast array of options, official and not, there's nothing quite like a $603 wire wheel/disc brake kit to make Sprites sit up and grin.

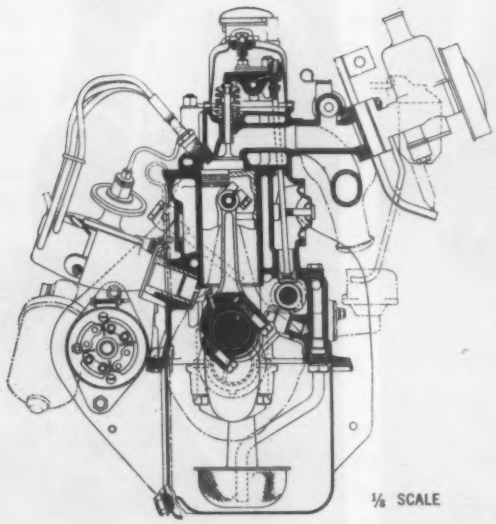


Handwork with portable grinder to heart-shaped combustion chambers is unmentioned in Tuning Booklet but it's a useful move for good gas flow.

Hold it, cowboy! Final oversteer is induced only by overcontrolling. Basic Sprite handling is good enough to permit increases in horsepower.

Road Research Report:
AUSTIN-HEALEY SPRITE

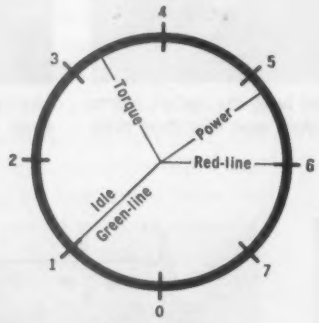
Importer:	**Hambro Automotive Corp. 27 West 57th Street New York 19, N. Y.**
Number of U. S. dealers:	**580**
Planned annual production:	**18,000**
Dollar value of spare parts in U. S.:	**$5,000,000**



⅛ SCALE

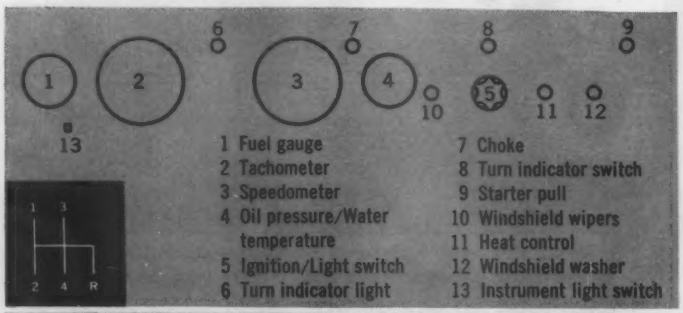
Steering Behavior

Wheel position to maintain 400-foot circle at speeds indicated.



Engine Flexibility

RPM in thousands



PRICES:

Basic Price	$1795
Options fitted on all cars imported:	
Heater/defroster	50
Tachometer	30
Windshield washer	15
Total	1890
Other options fitted on test car:	
Tonneau cover	35
White sidewall tires	30
Dealer preparation	35
Total price of car, as tested	$1955 at New York
Factory option:	
Stage V engine, prepared by Donald Healey, ordered as original equipment	380
Other options, available only through local dealers:	
Hardtop	$ 225
Quick-action filler cap	15
Lockable filler cap	7
Wire wheel and disc brake conversion kit	603
8-in front brake drum kit	56
Anti-roll bar	34
Stiff shock valves (set)	17
Stiff front springs	17
Stiff rear springs	36
Light steel flywheel	142
Close-ratio gearbox (see drive train specs below)	290
Parts to convert normal gearbox	66
5.38 ring and pinion set	27
5.38 complete assembly	75
4.55 ring and pinion set	20
4.55 complete assembly	75
3.73 ring and pinion set	29
3.73 complete assembly	80
9.3 piston set (std., .010, .030)	49
Set of piston rings for above	8
Camshaft (.315-in lift)	32
Set of inner valve springs & collars	11
Distributor	37
Front manifold	11
Exhaust pipe	7
Muffler	8
Clips for above	2
Dual exhaust system	21
Thermostat blanking sleeve	1
Large capacity oil pan	40
Oil cooler kit	110
Pair of 1¼-in S U carbs	77
Manifold for above	30
Polished cylinder head assembly	158

OPERATING SCHEDULE:

Fuel recommended	Regular
Mileage	32-35 mpg
Range on 7.2-gallon tank	230-250 miles
Oils recommended	SAE 30 or 20W/30; below freezing, 20W; below 10° F., 10W. (SAE 10W/30 is also approved.)
Crankcase capacity	3.6 quarts (4.2 with filter change)
Change at intervals of	3000 miles (filter at 6000 miles)
Number of grease fittings	12
Lubrication interval	1000 miles
Most frequent maintenance, interval recommended:	Refill transmission, rear axle; oil water pump; grease front hubs—6000 miles.

ENGINE: (BMC "A" series)

Displacement	57.9 cu in, 948 cc
Dimensions	Four cyl, 2.48 in bore, 3.00 in stroke
Valve gear	pushrod operated, vertical overhead valves, stamped rockers
Compression ratio	8.3 to one
Power (SAE)	48 bhp @ 5200 rpm
Torque	52 lb-ft @ 3300 rpm
Usable range of engine speeds	1000-6000 rpm
Corrected piston speed @ 5200 rpm	2360 fpm

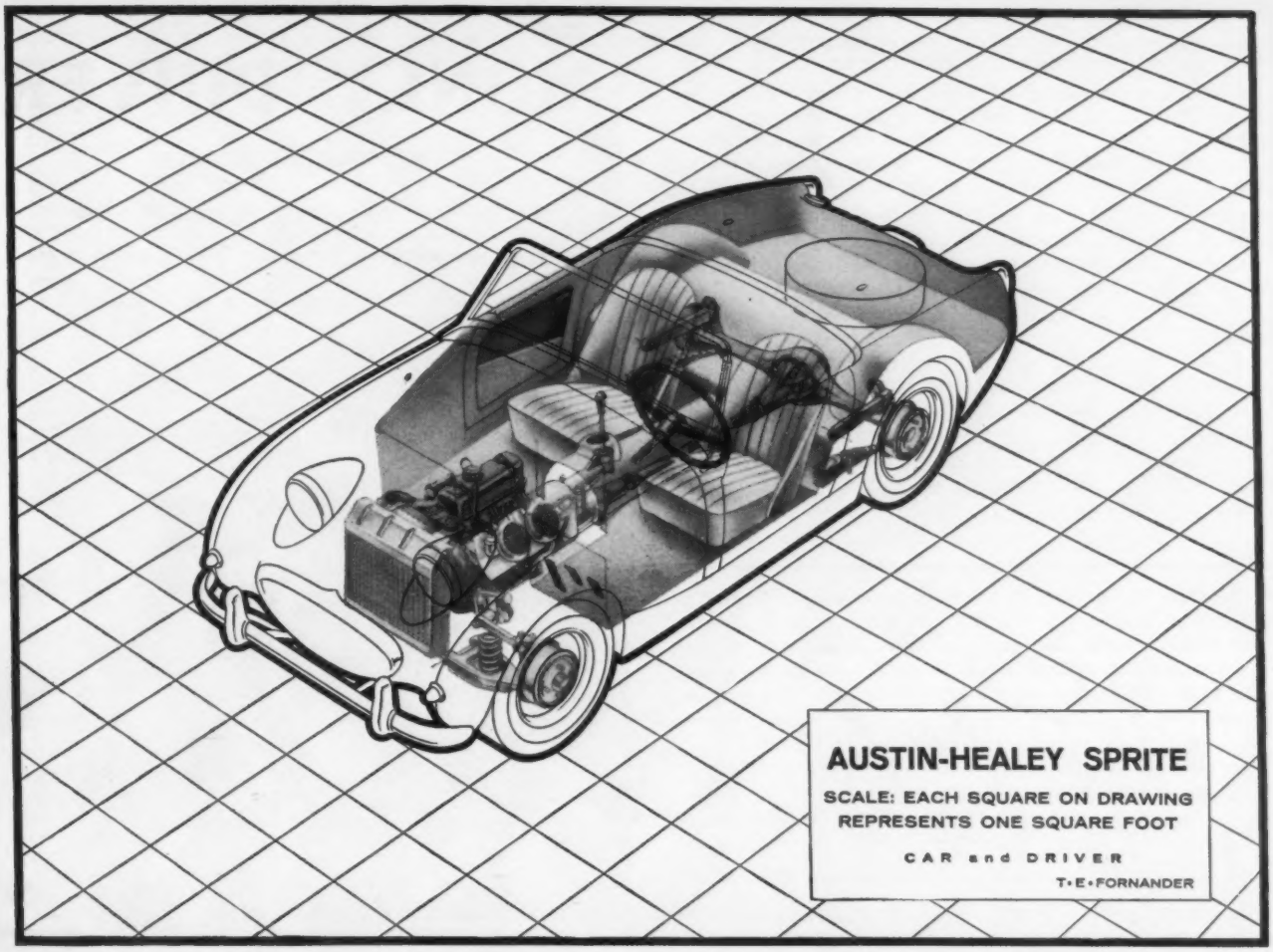
CHASSIS:

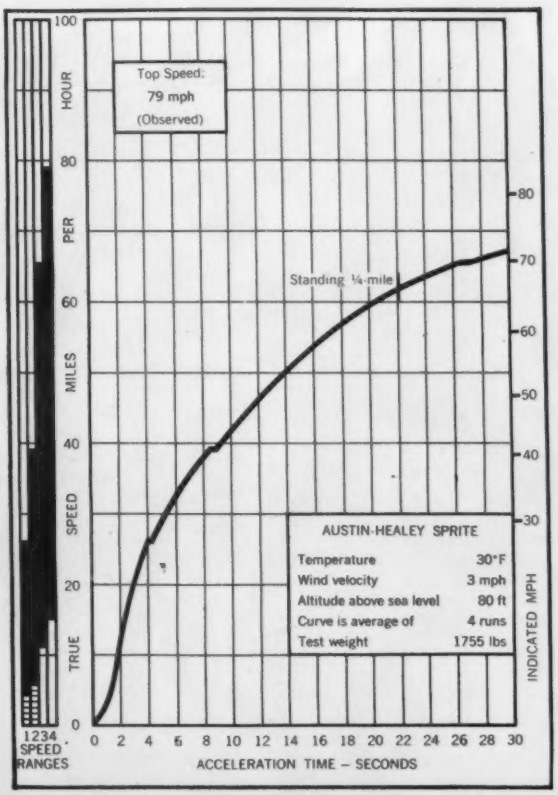
Wheelbase	80.0 in
Tread	F 45.8, R 44.8 in
Length	113.3 in
Ground clearance	5.0 in
Suspension:	F, ind., coil spring, wishbone and control arm; R, rigid axle, trailing quarter-elliptic leaf springs and control arm.
Turns, lock to lock	2½
Turning circle diameter between curbs	30 ft
Tire and rim size	5.20 x 13, 15 x 4J
Pressures recommended	F 18, R 20 psi
Brakes; type, swept area	7 in drums, 110 sq in
Curb weight (full tank)	1480 lbs
Percentage on driving wheels	47%

DRIVE TRAIN: (BMC "A" series)

Gear	Synchro?	Ratio	Step	Overall	Mph per 1000 rpm
Rev	No	4.66		19.69	—3.3
1st	No	3.63	53%	15.32	4.3
2nd	Yes	2.37	68%	10.02	6.5
3rd	Yes	1.41	41%	5.96	10.9
4th	Yes	1.00		4.22	15.4
Optional close-ratio gearbox:					
Rev	No	4.11		17.39	—3.8
1st	No	3.20	67%	13.51	4.8
2nd	Yes	1.92	41%	8.09	8.1
3rd	Yes	1.36	36%	5.72	11.4
4th	Yes	1.00		4.22	15.4

Final Drive Ratios: 4.22 to one standard; 3.73, 4.55 and 5.38 to one optional.


AUSTIN-HEALEY SPRITE
SCALE: EACH SQUARE ON DRAWING REPRESENTS ONE SQUARE FOOT
CAR and DRIVER
T•E•FORNANDER


Top Speed:
79 mph
(Observed)
Standing ¼-mile
AUSTIN-HEALEY SPRITE
Temperature 30°F
Wind velocity 3 mph
Altitude above sea level 80 ft
Curve is average of 4 runs
Test weight 1755 lbs
TRUE MILES PER HOUR SPEED
INDICATED MPH
1234 SPEED RANGES
ACCELERATION TIME – SECONDS
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
0 20 40 60 80 100
30 40 50 60 70 80

MONEY DRIVER

by Steve McNamara

Bill Krause drives hard to win, in a way that angers Jack Brabham but makes Jim Hall say, "He's a hell of a race driver."

From Letters in SCI for August, 1959:

The article in your June, 1959 issue about the Pomona Grand Prix smells. It stated, "With the exception of the D-Jag driven by Ron Flockhart. . . the machinery was strictly small bore." Well, if Bill Krause drove his own D-Jag instead of Phony Flockhart, he could have won. Flockhart isn't all he is cracked up to be. Nobody had to leave the way open for Bill Krause. Even if Gurney hadn't have blown, Bill would have caught him. Ken Miles did not see Krause's tire going. It was impossible for him to see. You didn't say anything about Krause's ability and determination. Nobody gives him credit for driving a beautiful race. He's the best driver around anywhere. Someday you'll see Krause the top driver of all time. I'm sick and tired of you people yapping your mouths about the other drivers. Say something about Bill Krause, because someday you won't be able to keep him out. Bill Krause is a great guy besides being a great driver. He never brags about himself, so I'll do it for him.

Mrs. Bill Krause

► Bill Krause had fought his way from 19th to third and was aching to pass Augie Pabst and get a shot at Stirling Moss. Pabst's Scarab and Krause's Birdcage Maserati ripped into Laguna Seca's Turn Four, a left bend with no guard rails, bordered on the outside by a rocky cliff that plunges hundreds of feet almost straight down. To Krause it was just a wide place on a narrow road.

Jim Jeffords, a tiger in his own right who was following Pabst and Krause, later said incredulously, "Bill tried to get by Augie on the outside! Can you imagine that? With that cliff staring him in the face he tried to pass Augie on the outside! He looped three times but by God he tried. I wouldn't even think of doing that." Jeffords paused and shook his head in wonder. "I must not be a race driver."

Bill started racing in 1953 in a three-quarter midget he built at home, with Triumph 'cycle power.

Jeffords is a race driver, but not quite like Bill Krause. Few men are, a fact which consoles Jack Brabham. The World Champion's fall tour of the U.S. was not a smashing success and after both Watkins Glen and the Riverside sports car race he was moved to criticism of "blocking" tactics of American drivers. After Laguna Seca's Pacific Grand Prix sports car race, he was really moved. Brabham had spent part of the first heat ducking stones thrown up by Krause's Birdcage as it drifted from verge to verge. In the first heat one of the stones blew out a tire on Brabham's Cooper Monaco and split a brake fluid tube which went undetected until the second heat, when the detection featured several spectacular, brakeless loops. Taciturn Brabham abruptly turned voluble and said, among other things, "I don't know whether Krause is a beginner but I know he wouldn't last long in Europe. They just wouldn't stand for it."

Brabham's anger was not shared in the least by an American driver whose placing and take-home pay were drastically lowered in an (*Continued on page 74*)

At the Los Angeles Times-Mirror G.P. in 1959 Krause drove his familiar D-Jaguar-Corvette. He's trailed here by Jack Flaherty in a Lister-Jaguar.

There wasn't much left of this shoe after Bill limped home on it at the Pomona G.P. referred to by Mrs. Krause. Dan Gurney isn't sympathizing.

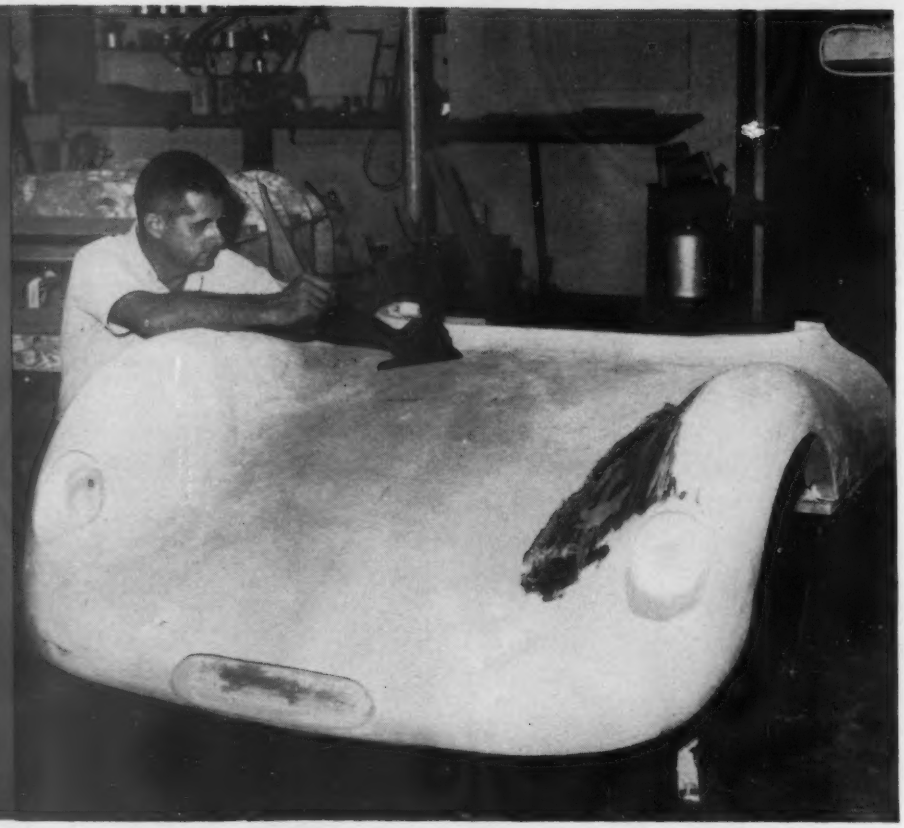
PHOTOGRAPHY: ROBITSCHEK, CHITTENDEN, NEHAMKIN

Also at Pomona in 1959, Bill looks lost in the huge 450S Maserati then owned by Rey Martinez. Krause also drove the ex-Porter Mercedes SLS.

A race car that is low in cost but high in performance is news. That's why we stopped the presses to bring you . . . .

THE BEGRA STORY

by Bryan Webb



Co-builder Gene Beach — the Be in Begra — works on plaster mold for nose of the Sebring-bound Mark II.

► In Florida, a state known for beauty queens, guided missiles, mosquitos, and an annual 12-hour endurance orgy, something new has been added. It is a racing car weighing in at 630 pounds soaking wet, which has gone from a bundle of parts to a Sebring entry in less than two years.

The Bégra (pronounced Bay-Gruh) was sixteen months aborning but the results have proven to be worth the trials and tribulations of the two "fathers", Gene Beach of Clearwater and Henry Grady of Miami.

The car grew out of the old saw "If you can't buy what you'd like to race, go out and build it." The project began early in 1959, when Grady was working in the Clearwater area, but he took a job forming a foreign car parts distributorship in Miami while Gene Beach remained behind plying his trade as architect. Months before actual work began the two spent long hours discussing the assets and costs of the engines, components, and running gear available for building a 750 cc H Modified car. They finally settled on a Fiat 600 sedan which they purchased from a nearby dealer.

They welded their space frame from one-inch-square mild steel tubing and to this basic platform attached the steering and suspension components from the "600". Beach fashioned the steering wheel from aluminum and teak, and fitted its steering column with small airplane-type universal joints. Koni shocks were installed all around to stiffen the suspension. Little more was done in these areas until actual racing experience proved that further modifications were necessary.

When the car had been finished as far as belly pan, suspension, engine and transmission installation they towed it to Miami looking for all the world like an overgrown Go Kart. Henry then took the Bégra to the home garage of now-defunct Camoradi, U.S.A. and set up the chassis and wheel alignment. What resulted was a car which mechanic-driver Lee Lilley, 10th-place winner at LeMans last year, calls "knock-kneed, bow-legged, pigeon-toed, and slew-footed . . . but it works!"

In Miami Henry began work on the first little engine. With a micrometer and the parts house at his disposal he produced some interesting, if not quite Abarth, modifications on the Fiat 600's prime mover.

Meanwhile Gene had been working steadily on the all-aluminum body, pounding most of it out over an old stump in his back yard. To this degree it can be called a "back-yard special." However, Gene's coffee-making wife Lil insists that it's a "two-car garage special." The gas tank was made from the aluminum sheeting (of a size that Lil called "0-2-thin") of which the body and belly pan were formed. Finally the chassis and engine were towed back to Clearwater and fitted with the hood and rear decking one week before its race debut!

This first outing was at the twisty 2.7-mile course near Cocoa in April of 1960. Gene picked up Team Bégra's first victory with a class win in the ten-lap event for Triumphs, Porsches, MGAs, Alfa Normals and the like. He also finished third overall in a field of 33 cars, being bested only by two Porsche 1600 Supers. Further class wins were notched up in two big meets at the Daytona road course.

At mid-season a test on an accelerometer in Miami made it painfully evident that future Bégras—if they were to challenge OSCAs and Fiat Bialberos—would have to produce more horsepower. A little over 40 bhp was just not going to cut the mustard! With this thought in mind the prototype was sold to novice Jerry Morgan (novice or not, Jerry on two successive weekends, took his new purchase to two class wins and a third and fifth overall) while the decks were cleared for production of a Saab G.T.-powered version.

The decision to use a Saab engine was initially based on the need for more horsepower, with economy a strong secondary factor. A wrecked Saab was bought, and the work on the block started to bring its normal 38-bhp engine up to G.T. specs and power. The head was altered to raise the compression ratio. Finally a stroke of luck came when the Saab distributors in Jacksonville, after seeing the Bégra race, agreed to provide a G.T. crankshaft for the new engine. This raises the compression in the lower case and provides more efficient fuel mixture induction into the combustion chambers.

An adapter plate was fashioned so the engine could be bolted to the Fiat 600 transmission-differential unit. The outer edge of the Saab flywheel was planed off at 20 degrees so that it would fit inside the bell housing. They decided to retain the Fichtel and Sachs clutch unit from the Saab because of its beefier dimensions. To wed the Fiat's mainshaft splines to the Saab unit, a center section from Import Motor Parts' stock of Fiat driven discs was fitted with the larger outer-driven surface and the initial steps of installation were completed.

In the original Saab installation the engine slants at a goodly angle. The same power plant, when used in the Bégra sits bolt upright. This naturally required a few changes. An intake manifold was cast so that the Solex 44 PII carb would also sit upright, while motor mounts from a Renault 4 CV were adapted to the Bégra frame and the new three-cylinder engine. Races at Daytona soon showed that the engine, although it put out more horsepower and torque than the former pushrod unit, broke up at varying rpm and seemed unpredictable as to just where the power was going to come in.

Everything possible was done in an effort to tune that two-stroke but seemingly to no avail. An onlooker suggested that they unhook the electric tachometer which is fed by the distributor. "After all, Martin Tanner doesn't use one Maybe there's a reason." This was done, the car fired up and blasted off, its exhaust note clean and clear!

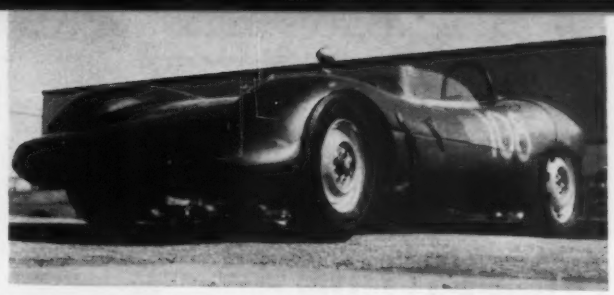
When Henry returned there was again a smile on his face. "That's it! By golly, that's what was ruining it! Now it really goes." Evidently the tach had been draining current or forming a resistance in the primary circuit for now the Saab sounded as it should.

Probably the highest compliment that can be paid a car of this type is for it to be accepted by the directors of an international event. The Twelve Hours of Sebring is such a race, and director Alec Ulmann has accepted a Saab-powered Bégra as an entrant in the March 25 contest.

The car will run in Sports Category "C" as a prototype American racing car, and with its 750 cc displacement will be vying with the long-successful OSCAs and D.B.s. John Bentley has been approached to drive the car at Sebring. As team driver Mr. Bentley would bring with him probably more knowledge concerning the Sebring event than any other driver. This will be his eighth year at the Twelve Hours, in about as many different automobiles. Last year Bentley won the Index of Performance driving an OSCA (SCI, August, 1960).

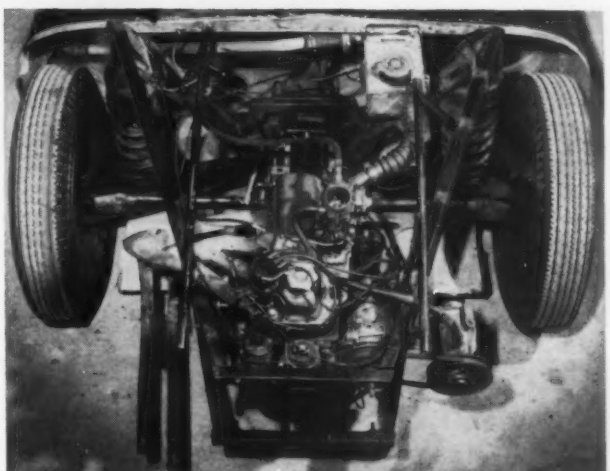
What makes this car a success is hard to determine. Its handling appears on a par with anything racing today. Its lightness is a contributing factor to its acceleration and the Bégra-Saab's small frontal area adds speed on long straights. But more than this is the Yankee ingenuity that has gone into the car's construction. Built on a "nothing down, pay as you race" basis, the car will be up against Europe's best at Sebring, and it will be good to see it in action. Not since Briggs Cunningham built his famous sports-racers in Palm Beach has a postwar American racing car gone so far so quickly.

Beach and Grady are dedicated to the little car. Perhaps this is the answer.

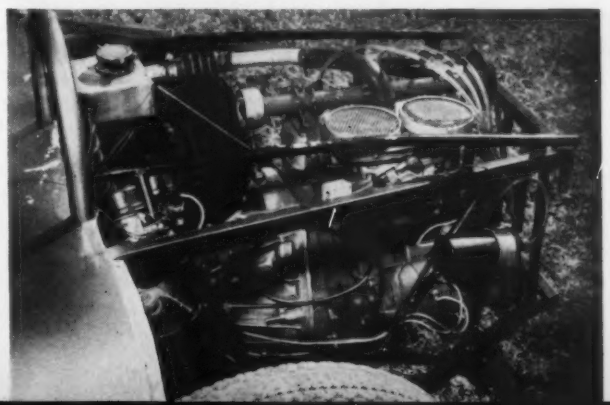


Prototype Begra was bodied in aluminum and used low-mounted headlights. Windshield was one inch shy of meeting F.I.A. rules for sports cars.

Angular appointments of Begra's cockpit point up simple, direct approach to race car design. Body had to be altered to incorporate F.I.A. doors.



Fiat-based engine mated well with 600 sedan rear suspension. Relationship of coil springs, drive shafts and A-arms remained almost stock. More power below — better than 57 bhp — will come from Saab engine.



COMPETITION TUNING: A.C. BRISTOL

by Wayne Thoms

Few cars are better for dual-purpose use than this handsome roadster. The A.C. Bristol looks like a race-bred sports car and has the speed to match. Stu Haggart, seen at right, supervised the race-winning preparation described below.

► "It's an easy car to go fast in — safely." With that brief pronouncement about the A.C. Bristol's race-course manners, driver Ronnie Bucknum sums up the car's many virtues from the driver's point of view. His instantaneous success in Rene Pellandini's near-unbeatable red roadster most assuredly makes him qualified to comment.

Ronnie is the first to admit that he is not wholly responsible. He is an excellent driver, one of those naturals whose smoothness on any course is a pleasure to watch. But before he became the regular pilot, Lew Spencer rolled up an impressive list of victories with the same car. All this indicates that: 1) The A.C. Bristol is a tough car to beat in its two-liter class; 2) This particular machine, which often steps out of its class to beat bigger machines, is something special in itself.

Long hours of careful preparation are forgotten in a moment like this. Ron Bucknum waves after scoring a win in the Rene Pellandini red A.C.

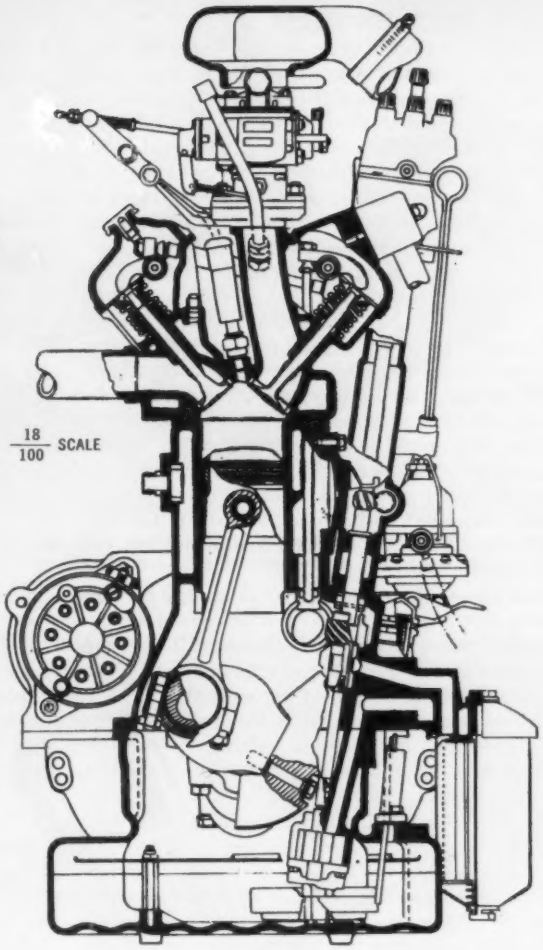
WHAT WILL IT COST?

What is the formula that makes it special? It is, in fact, quite simple, and anyone willing to follow the same procedure can imbue his A.C. Bristol with the same potential as Pellandini's. Admittedly, Pellandini goes at his racing seriously. As the Western U.S. distributor (Worldwide Imports, 2042 S. Sepulveda Blvd., West Los Angeles, California) this is to be expected. But the pleasant part is that the average owner's cost for race preparation should be well under $500, assuming a showroom-stock machine as the subject and with work farmed out at the going rates.

This price includes the cost and installation of an extra spring leaf front and rear, new rear shocks and all the required engine labor. It doesn't include engine parts because what's necessary can vary considerably. Engine work entails pulling the engine, degreeing the cam, checking rods, pistons, crank and flywheel for balance, Magnaflux of rods and crank, Zyglo inspection of pistons, rejetting the carburetors, oil sump baffles, and most important, a valve grind and valve spring pack.

Compared to most production sports cars that are currently winning race trophies, the work necessary on the A.C. Bristol is minimal. Of course, as Dennis May pointed out in "Play Your Ace" (SCI, August 1959) there are many major steps that can be taken to improve performance and handling. For our purposes, amateur club racing in the United States, most of these procedures immediately take the car out of the production class.

That's why we'll detail only those techniques allowable within the bounds of SCCA rules for production cars. Within those limits the Pellandini A.C. has been developed to its



present high-performance state by mechanic Stu Haggart.

HANDLING

Because Bucknum came to the A.C. after successfully campaigning a Porsche Super (1959 Pacific Coast Champion) and racing several times in an Alfa, his comments on handling are particularly revealing. He is especially intrigued because the car can easily be over- or understeered at will. "It all depends on how you enter the turn," he says. "I prefer to understeer through the dangerous turns – those with no margin for error. And generally on high-speed turns – those above 80 mph – I use understeer because I feel it is a quicker way around for me. Or I may enter a turn using understeer and deliberately change to oversteer, holding it with the throttle."

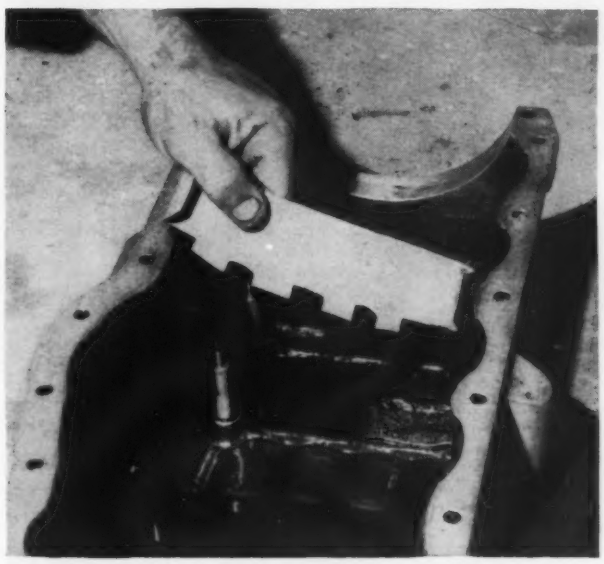
As Ronnie explains, the pushrod Porsche doesn't have the power to make this transition easily, even though it oversteers at the limit. Conversely the Alfa understeers, which Ronnie likes except in tight turns. Further, the A.C. does not corner flatly; there is some lean.

While his comments are a strong endorsement for the Bristol-powered Ace, they apply only to what can legitimately be done to the car to make it handle better than it does in factory trim. This includes three things: tires (not covered in our price total), springs and rear shocks.

The Ace comes with Michelin X tires, 5.50 x 16. While these are fine tires, experience with the Pellandini car shows that they are best reserved for rain-slick courses. Best results have been obtained with Englebert Competition P or Pirelli Stelvio six-ply, labeled "Made in Italy." According to Stu Haggart, it is virtually impossible for drivers to feel any difference in handling characteristics between the two brands. Pressures are largely a matter of experimentation, but a good starting point is 24 psi front and 26 rear, measured cold.

SPRINGS AND SHOCKS

The spring situation is one of the few areas where the car should have its boulevard character altered. Very simply, it is helpful to add a new leaf front and rear, giving a total of nine leaves front and eight rear. (This is one of the allowable extras on file with the SCCA.) Leaves for this car were made by the Los Angeles Spring Co. and are installed directly above the main leaf. They are about two inches shorter than the main leaf, although the length is not critical. Also they're ¼-inch thick rather than the standard 3/32 inch. There is a school of thought which recommends installing a longer rear main leaf in order to decrease the negative camber and induce more oversteer. As the car is delivered it carries from 1½ to 2 degrees of negative camber, which is within the factory limits. A main leaf is an expensive and tricky proposition and the experience of the drivers who have been consistent winners with the car is that its handling is perfectly satisfactory as is.



Two baffles, easily cut from light-gauge aluminum, eliminate oil surge in racing. Shaped as shown, they slip on upper baffle support studs.

During hard cornering, the A.C. shows an embarrassing tendency for the outer universal joints on the drive axles to bind against the lower A-arms. There is a simple cure. Replace the standard rear shocks with Monroes (Part No. L12124) and shorten them 1¼ inches. This allows more than adequate clearance. No change is needed on the front shocks.

There is a recommended suspension component replacement for some of the older A.C.s – the link pin which holds the rear shocks to the lower A-arms. Cars since 1958 have this new pin, or should have. With the old one it is necessary to tighten the Allen set screws after every race. The new pin has a beveled flange which keeps the shock in place and prevents it from loosening. Without the flange the shock works itself loose, carries an excessive load, the shock rubbers tend to collapse and the rear wheels judder in turns. Also, the old pins sometimes break in the area where the new ones have a flange.

MORE HORSES

As we said, there is precious little to be done to the engine. What is done is important and it must be done with great

care. Properly carried out, it can mean an additional 10-15 horses at the rear wheels – where it counts. They will appear somewhere between 5000-5500 rpm.

Bucknum's comments reveal that the usable rev range is rather narrow: about 4000 to 6000 rpm. (He can exceed 6000 without danger but to keep reliability at a maximum he has been requested to stay under it.) He says that this means plenty of shifting, sometimes requiring a drop into the non-synchro first gear to keep the engine up in the happy range. This range is limited by carburetion, and since the car is not driven on the street it works out very well.

CARBURETION

Selecting the proper jets is a cut-and-try process where one learns best through experience. Fortunately, the three Solex carbs (32 PBI-6) retain their standard 28 mm venturis. A good high-volume jet combination is – main jets: 140; air correction: 230; air bleed: 50, and low-speed jet the standard 1.0. This sets the carburetion up for average conditions. Average means neither extremely hot nor cold, humid nor dry – the sort of climate that prevails in the Southern California area.

For other conditions, let us cite Stu's experience at a recent Vaca Valley event in Central California. The temperature soared and rain fell just before the race, keeping humidity high. This meant it was necessary to go leaner. He arrived with No. 130 main jets and No. 220 air correction and the car ran beautifully. Further it is essential to disconnect the accelerator pumps to avoid flooding from a quick and heavy foot.

A must before attempting serious racing is getting adequate clearance between U-joint and lower A-arm. To get it, shock must be shortened 1¼-in.

IGNITION

In the fire department, Stu uses KLG plugs for everything. For warmup he finds KLG–50s are right. In actual racing he selects between T260 or T240. If the pace is relatively slow and they feel that the car will not have to be pushed to the limit to win, then it's the 240 – a hotter plug. But if the event is fast and the pressure is on, the colder 260 plug is indicated.

As far as ignition timing is concerned, Stu experiments between seven and ten degrees BTDC. Normal for the Bristol engine is about eight degrees.

CLUTCH

Some consider the A.C.'s eight-inch-diameter clutch the weak link in a well-forged chain. That's not necessarily so but it does require some special handling and emphasizes that a race car is a team of integrated components, each dependent upon the capabilities of the other. Stu has installed the optional clutch disc which has a solid center to stand the tortures of racing. Ronnie's driving technique is straightforward. Bring the engine up to 4000 rpm on the starting line and engage the clutch smartly. Forget about speed shifting. Best results and longer clutch life are obtained through normal shifts – lift the foot from the accelerator pedal and pause slightly at neutral. In fact, don't be ashamed to double-clutch.

VALVES

Probably the most significant step in race-preparing the Bristol engine is the work on the valves. A first-class valve grind is taken for granted. What requires additional labor is the selection of a matched set of inner and outer valve springs. For example, Stu went through 96 springs to get 24 matched (12 inner and 12 outer). Check the springs with a spring tester, using an arbitrary reading of one inch of travel (measured with a dial indicator), keeping only those that have the highest readings and are within two pounds of each other.

Now comes the critical part: shimming for maximum tension so that a few more revs can be coaxed along without unnecessary worry about valve bounce. This requires a dial indicator; Brown and Sharpe sells one with a jeweled travel for about $30. Learning to use it in this operation requires skill and patience. First, it is necessary to anchor the indicator rigidly or the readings will not be consistent. For the same reason the indicator's plunger must travel in the same line as the valve.

Get the appropriate tappet on the heel of the cam so that it is closed. (For this you will need a shop manual. There is only so much space for this story and we can't cover everything.) Now anchor the dial indicator. At this point we need zero valve lash so it is necessary to open the valve .001 inch off the seat with the adjusting screw.

Now comes the easy part. Open the valve fully by turning the engine by hand and reading the indicator. Stop.

Now force the valve open manually until the spring coils obviously bind. Get it open any way you like using pliers or screwdriver. Write down the difference in thousandths, shown on the indicator, between full-open and coil-bind. Typical differences will range from .080 to .124 inch. The difference should be only .060 inch at full coil bind, which can be obtained by inserting shims varying in total thickness from about .020 to .064 inch.

It's a good idea to check the valves again with the dial indicator after the shimming job is completed. You wouldn't make any errors, of course, but after awhile the shims all begin to look alike!

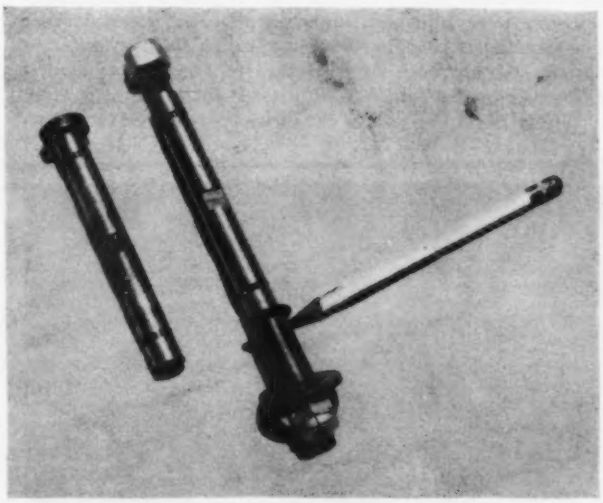
What have we accomplished by packing the valve springs? The coils are now just .060 inch short of coil bind at full-open. The importance of packing is dramatically illustrated when a pair of unshimmed springs is compared on a spring tester with a properly-doctored pair. We got a typical reading of 116 pounds with the unpacked springs, against 130 pounds after shims were added. This 14-pound difference is well worth the effort in higher revs with safety. One reminder: this is a job that must be repeated from time to time. The springs will lose about five pounds after three race meets due to fatigue and an occasional careless 7000 rpm.

PAN BAFFLES

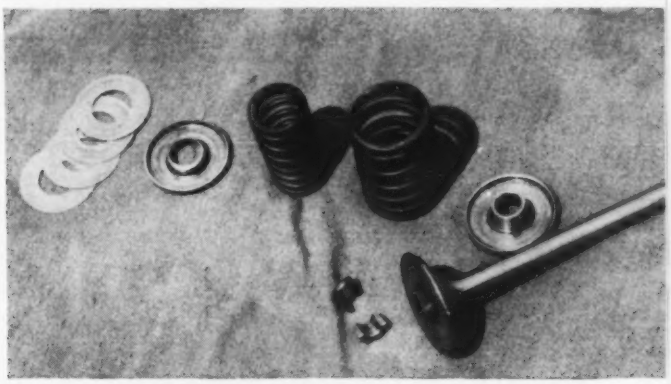
These are the sort of gadgets anyone can hack out of light sheet aluminum with a pair of tinsnips. With bad luck it should take ten minutes. Make two and bend a tab around the support studs for the standard upper baffles. Once inserted they prevent surge away from the oil pump pickup during hard braking. *(Continued on page 88)*

Shims go under valve springs to increase closing forces on valves. Shim till there's but .060 between valves wide-open and coil-bind.

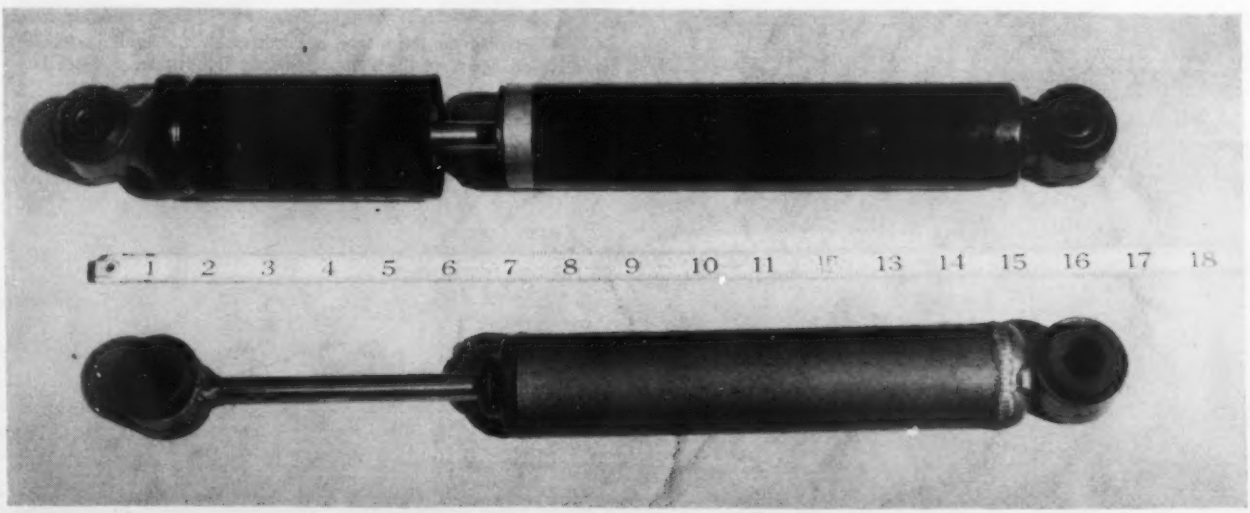
A delicate and tedious job, the selection of matched inner and outer valve springs, shimmed for extra stiffness, is demonstrated by Haggart.



Post-1958 link pins, illustrated with pencil, are recommended because of flange to keep shock in place. Old pin shown broke at flange point.



The shims at left add stiffness to the valve springs and permit higher revs with safety. Unpacked springs may give 116 lbs.; shimmed springs, 130.



The stock shock absorber (top) is longer than modified Monroe unit, part number L12124, which is shortened 1¼ inches to prevent fouling U-joint.

If Porsche built a six-cylinder sports coupe it would have to resemble this airy and bright modified Monza.

Corvair Monza

► For a crusty old sports car enthusiast who can remember discovering Dr. Porsche's quick little coupe back in the early '50s along with a few thousand other snobbish "in" types, this particular Corvair Monza came as a bit of a shock. Our experience with the type was spread over two different examples: one in white paint with RED interior, the other blue with complementing blue and white upholstery.

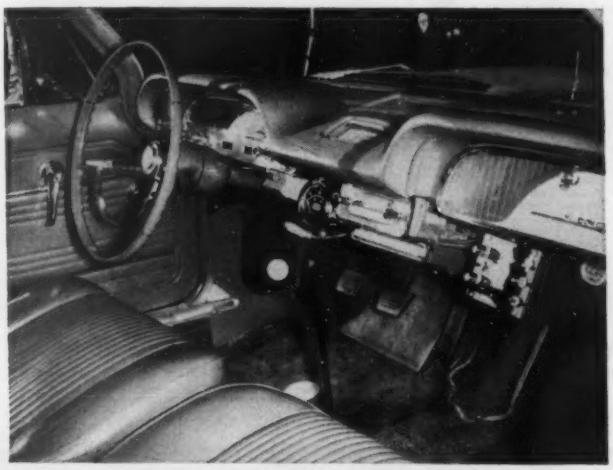
Both cars were supplied to us by ad exec Kingsbury Moore, who in his infatuation for fast, tractable automobiles has become embroiled in modifying his Monza and helping to supply similarly tuned cars for his friends.

That the blue car surprised us with its acceleration and handling was no shock. Many U.S. auto buffs have been taking a "head in the sand" position in regard to changes in the native product over the past five years. A short, quick ride in a thoughtfully modified Monza will have them assuming a heads-up attitude in no time at all.

At this point we can hear the diehards jumping all over the phrase "thoughtfully modified". Yes, our Monzas were modified. They were not like the ones on your dealer's showroom floor. But in all honesty — in this age of massive mass production — would you take a car straight from a dealer into a major rally? C/D's two test cars were both different from stock in the following ways: Michelin X tires all around, Koni shock absorbers at each wheel, Sun Electric tachometer, rear end on the blue one decambered by precise torching of the rear coil springs, one car's spare tire moved to the front luggage compartment, and both equipped with safety belts. Another, and much more subtle, difference between the test cars and other Monzas was that all adjustments, tinkering and fiddling that should take place at the end of the production line did in fact take place.

Aside from all these owner-installed options the cars were ordered with the following factory equipment: four-speed gearbox ($64.60), heater and defroster ($74.25), padded dash ($18.30), heavy-duty battery ($5.40), undercoating ($35), lower rear axle ratio ($2.20), 98 bhp engine ($26.90), and something called "the comfort group" consisting of two outside mirrors, two sun visors and a light in the glove compartment for a whopping $38.75. The best buy in this listing of factory options is, without a doubt, the more powerful engine. Differences between the 80 and 98 bhp engines are detailed in the February Technotes column. All that need be said here is that the hot cam and bigger carburetor jets used to harness the 18 extra horses do not impinge on the engine's tractability.

How do all these extras work out in practice? So well that it only takes a few miles before they lose the appellation "extra". Driving the modified Monza is — in a word — pleasant. In the opening paragraph we touched on the fact that the modified Monza has the same happy feel as the early Porsche coupes. This we think is a compliment to both Porsche and Chevrolet. In each case the automobiles under discussion were built on an economy base, the difference being in what is considered economical in the two different countries. If memory serves the early Porsches exuded a run-for-ever quality which is duplicated in the present Monza. When thumping down a thruway with GM's sports



Dashboard styling on the Monza is unmistakably GM in its execution. Non-standard items are the electric tach and speedometer in black box.

Steering right into a left-hand turn tells the story on the handling of the Monza. Admittedly, it had to be provoked to make its tail twitch.

PHOTOGRAPHY: TYPOND

coupe there is never a flickering picture in the back of the driver's mind of small, hot parts revolving themselves to destruction. Both vehicles (decambered Monza and early Porsche) are driver's cars in the sense that to get what they have to offer in the way of performance requires a deft, knowledgeable touch. This can be, and is, fun. What Porsche would have done with a six-cylinder 98-bhp production engine back in the '50s is almost as interesting a question as what GM could do with a truly dedicated work force in the '60s.

The gearbox and its attendant linkage were smooth and direct-acting with very little of the vagueness usually associated with a rear-engined car. The ratios were well spaced and the whole unit seemed to be happily mated to the optional engine. The regular rear end ratio would make it an almost-perfect union. In any gear there was enough power available to make you keep both hands on the steering wheel, and passenger conversation to a minimum. Any sporting car worth its high octane shouldn't be dead silent (this is a personal opinion, but one we believe shared by many who love fast cars), and the Monza – with an exhaust pipe and tail pipe some half-inch bigger than those on the gentler version of the Corvair – produces a satisfactory whirring growl.

Seating in the Monza was another pleasant surprise. Two handsome – by any definition, be it Stuttgart or Detroit – individual seats cradled passenger and driver with a happy combination of straight, tall backs and cushions with almost enough of a depression in them to keep you anchored during violent maneuvers. Seat height was good, allowing you to drive with slightly bent knees yet still permitting good forward vision for short drivers. One thing that we approved was a positioning of wheel and seat that allowed these same under-six-footers to "Fangio it" with almost straight arms, while still being able to get on the stop and go pedals without disappearing under the cowl. Recent GM cars seem to force a driver into a close-to-the-chest steering position. This may be the accepted style for a hot poker game, but it is not conducive to accurate and fast motoring in the Continental manner.

While on the subject of steering, this is a definite weak point in the Monza. It is light and fairly accurate but just – at five turns lock to lock – not fast enough. With the decambered rear helping to stave off the onset of the thus unmanageable oversteer, the Koni shock absorbers limiting body sway and bobble on wavy surfaces, and the Michelin X braced-tread tires producing extra cornering power, the Monza is (despite the slow steering) a remarkable road car. Proof of this is the seven rally trophies won in three weeks by Kingsbury Moore.

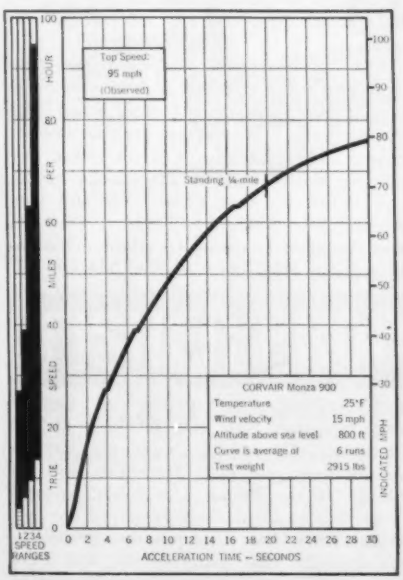
On the subject of Corvair handling it is obvious that decambering effects the biggest change in the car. The resulting one degree of negative camber is produced by "torching" the rear coil springs. Needless to say this should be done by someone dedicated to accurate work. Too much heat and the Monza will look and act like a kicked pup; not enough will only result in a shop bill and a still-stock

(Continued on page 86)

ROAD TEST:

CORVAIR MONZA 900 Coupe

Price as tested:	**$2800 with modifications**
Manufacturer:	**Chevrolet Motor Division General Motors Corp. Detroit 2, Michigan**


Top Speed:
95 mph
(Observed)
Standing ¼-mile
CORVAIR Monza 900
Temperature 25°F
Wind velocity 15 mph
Altitude above sea level 800 ft
Curve is average of 6 runs
Test weight 2915 lbs
TRUE MILES PER HOUR
INDICATED MPH
1234 SPEED RANGES
ACCELERATION TIME – SECONDS
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30

ENGINE: (Super Turbo Air Six)

Displacement	**145.1 cu in, 2383 cc**
Dimensions	**Six cyl, 3.44 in bore, 2.60 in stroke**
Valve gear:	**pushrod overhead valves, hydraulic lifters, 1.5 to one rockers.**
Compression ratio	**8.0 to one**
Power (SAE)	**98 bhp @ 4600 rpm**
Torque	**132 lb-ft @ 2900 rpm**
Usable range of engine speeds	**750-5000 rpm**
Corrected piston speed @ 4600 rpm	**2290 fpm**
Fuel recommended	**Premium**
Mileage	**17-21 mpg**
Range on 14 gallon tank	**240-300 miles**

CHASSIS:

Wheelbase	**108.0 in**
Tread	**54.0 in**
Length	**180.0 in**
Ground clearance	**5.5 in**
Suspension:	**F, ind., coil, wishbones; R, ind., swing axle, coil, trailing wishbone.**
Turns, lock to lock	**5.0**
Turning circle diameter between curbs	**39 ft**
Tire and rim size:	**6.40 x 13 Michelin X (6.50 x 13 std); 13 x 5½J**
Pressures recommended:	**F 20, R 25 psi normal driving; F 25, R 30 psi fast driving**
Brakes; type, swept area	**9 in drums, 198 sq in**
Curb weight (full tank)	**2600 lbs**
Percentage on driving wheels	**63%**

DRIVE TRAIN:

Gear	Synchro?	Ratio	Step	Overall	Mph per 1000 rpm
Rev	No	3.66		14.21	5.0
1st	Yes	3.65	55%	14.18	5.0
2nd	Yes	2.35	63%	9.13	7.8
3rd	Yes	1.44	44%	5.74	12.6
4th	Yes	1.00		3.89	18.3

Final Drive Ratios: 3.89 to one; 3.27 and 3.55 available.

MONEY DRIVER

Continued from page 64

encounter with Bill. For the last few laps of the second heat Bill had been trying desperately to get by Jim Hall's Birdcage and back into third place. On the hairpin turn starting the last lap Bill pulled up inside Hall and stayed off the brakes. The nose of his white Maserati smashed into the side of Hall's red car and slammed it into the haybales. Bill cranked the wheel and started his last lap in third place.

Spectators gasped at the daring and violence of this passing maneuver. But most of them failed to notice that Bill slowed down on the next turn and waved Hall by. Unfortunately, the impact of the crash had disabled Hall's fuel pump and he wound up in seventh place. "Mad at Bill?" said Hall, a lanky and very fast protege of Carroll Shelby. "Naw, he just got a little too hot. He didn't mean to hit me. Didn't you see him wave me by on the next turn? He's a hell of a race driver."

Hall's estimation is shared by many top American drivers, particularly those in the growing group of no-nonsense professionals who drive to win, with only modest concern for the mechanized polo niceties out of which the sport first grew. These drivers know that nobody goes deeper into a turn than Bill Krause but their faith in his ability is such that they don't worry about such encounters. Some of them just get out of the way. Belief in Bill reaches its highest pitch within his fiercely loyal family, led by his wife, Virginia, and his father, Arnold, an excellent mechanic who has caused some bickering by advising owners of Bill's cars on what ought to be done. The believers also include the Maserati factory, whose representatives for 11 Western states own the car Bill drove during late 1960 and who invited Bill to Modena last November to discuss possibilities of the rear-engined Birdcage and a new Formula 1 car.

This is a nice development for Bill, but, to those who have followed his career, hardly a startling one. As his father said, "Bill should have been in like this two years ago." Bill himself, with unbounded self-confidence, agrees that his reward is deserved, but he adds frankly, "Now I have as good a car as anyone else. It's up to me from here on out."

Bill's honest attitude, which often borders on the blunt, has combined with other factors to win him an unusual standing in racing circles. Although his no-holds-barred driving style has raised some eyebrows and tempers, notably Mr. Brabham's, Bill is wildly popular by comparison with some East Coast drivers who share his direct approach. One driver remarked that Bill is a "tough kid, all right, but he's a real race driver and you can't help but admire him." Admiration, not affection, is the word. Bill's past and future are miles from the gymkhana-checkered cap school of motoring enthusiasts.

Bill is a hard but not a punishing driver and consequently his admirers include car owners. His record includes many breakdowns but virtually all were caused by the maddeningly minor mechanical faults inherent in home-maintained cars. Bill's engines don't blow through the hood nor do his gearboxes splinter onto the pavement, because Bill is a very knowledgeable mechanic and he usually goes no harder than his car calls for. Most apparent proof of his good reputation is the Maserati assignment. It's doubtful that the factory would place its increasingly delicate creations in the hands of a mangler.

An impression of Bill changes considerably when one moves up from watching to talking distance. At ten feet he's a short, rugged young man with a youthfully-constructed face for 28 years, which usually carries an expression of grim determination. (The youthful features are a source of some pain; he does not like being called Billy and although the oldest of his three children is seven, it's only within the past two years that bartenders have stopped asking for proof of 21 years.) Bill is nervous, almost jumpy, before a race. There is no clowning as he moves about in his white driving suit with maroon stripes down the sides, *a la* American midget and championship drivers, perhaps carrying his helmet painted with brilliant flames. At ten feet he looks rather unapproachable.

But move up and talk with Bill. He's an agreeable, very astute young man who jumped a year in his schooling, finished Compton (Calif.) High School with excellent grades and speaks clearly and forcefully about all aspects of his chosen career — automobile racing. At one race many drivers were muttering about the feature being divided into two heats. Bill said he'd prefer one heat but that wasn't the point. "They put in two heats to interest the crowd. What these drivers don't seem to remember is that without crowds you wouldn't have motor racing." Jim Crow, a California racing editor and publicist, once grabbed Bill as a last-minute substitute for a pre-race radio show and was pleasantly surprised to find Bill had a much more incisive knowledge and a greater willingness to give direct answers than any driver he'd ever talked with.

Bill's background, much more Offenhauser than Morris Garages, begins with his father. Arnold Krause raced a bit and then owned cars, mostly midgets, starting in the 1930s. Bill took to puttering about his father's machine shop (he's now foreman) and at age 19 built a three-quarter midget with a Triumph motorcycle engine. He raced that car and its successors with considerable good fortune and in 1955 won the three-quarter-midget title for Southern California. This took some doing since at the time Bill was in the Army stationed at Fort Ord, some 300 miles north of Los Angeles. Bill did it by hiring replacements for guard duty and rushing south for weekends.

The Compton Comet also rushed himself into a flip which hurt his neck. The mishap didn't bother Bill unduly, but it did bother his father. Krause Senior decided to switch his son to the ostensibly safer sport of sports car racing and to this end bought a D Jaguar. Right off the bat Bill won his first race, and in the now-customary Krause fashion. Going into the last lap at Bakersfield, Bill was second behind John von Neumann. The first turn came after a long straight so Bill kept his foot in the works, twitched the car into a long, long slide, pulled through the turn in the lead and won the race.

In 1956 Bill joined the Road Racing Register, a professional group made up in the main of mediocre machinery. Bill was the big star of the operation and won five of six races, one of them on four cylinders. Then started three years of frustration, during which Bill stamped himself as an outstanding driver and won some races but was hounded by mechanical gremlins. His cars included the D Jag with a Corvette engine, a 4.5 Maserati owned by Rey Martinez and Dick Becker's Mercedes-Corvette. The year 1960 worked out better for Bill. It was highlighted by victory in the sports car class of the Pike's Peak Hill Climb and the really big win at Riverside last fall — Bill's first outing in a Birdcage.

Bill's drive at Riverside was typical of his style, a "money race" style, as his father describes it. Bill has no burning desire to be first across the start-finish line on every lap, only on the last one. His great self-confidence is reflected in the way he enjoys trying to rattle drivers ahead of him, and in his mastery in traffic, often picking up places more easily than in a two-car duel. At Riverside Bill hung on the heels of Dan Gurney and Stirling Moss until they faltered, then took first and won the race.

Bill's first love is road racing, but, as his driving suit and insistence that his cars be "sanitary" might indicate, he has his eye on Indianapolis. He'd like to race there in "a different kind of car" than the A.J. Watson-perfected roadsters that are now cleaning up. Bill has in mind a lighter car, perhaps with independent suspension. There is nothing revolutionary about this view. Rodger Ward, for one, believes independent suspension was abandoned too soon at the Brickyard and can be made to work.

Bill believes he has "improved the most during the last one and a half years. My biggest boon has been finding a car like the Birdcage, a dependable car that doesn't change all the time. I don't think my driving ability is going to change much; I've found my own capabilities and confidence. Now I've got to learn the circuits and the cars. Learning to adapt my capabilities to new cars is the biggest job ahead of me. I'd like to settle down and I hope it's with Maserati."

If Maserati shares Bill's sentiments he's likely to appear in Europe before too long to test Mr. Brabham's prediction. One of Jack's principal complaints at Laguna Seca was that Bill "was blocking me all afternoon. I had the faster car but he wouldn't let me by." To which Bill replied, "In the second heat I had to fight from 19th to third. Nobody waved me by." When Bill follows his reputation to Europe it's doubtful that many drivers will wave him by. But don't bet against him getting there — on the inside, outside or over the top. *—SMcN*

Turn Your FIAT Into A Tiger!

Meet us at the Coliseum!

International Auto Show Booth 213 April 1-9

ABARTH

FREE-EXHAUST SYSTEMS

■ Discover the thrilling new experience of driving with ABARTH—the exhaust system that was designed especially for your Fiat! Your ABARTH-equipped car will deliver power-packed performance for a drive that's pure luxury all the way! You will delight in the greater acceleration—in the incredible way your Fiat 'levels out' hills—its smoother engine performance. ABARTH Free-Exhaust Systems eliminate back-pressure, enabling you to get up to 28% *more power!* And, you will find that ABARTH saves on fuel—lets you enjoy greater gas economy. Why not join the thousands of satisfied ABARTH owners who experience *extra driving pleasure* each day with an *ABARTH Free-Exhaust System.*

FIAT Model F-500
With Heat Riser
$34.50

FIAT Model F-1200
For Sedan and Spyder
$79.50

Also available:
Model F-1158 for 1100

FIAT Model F-600
for Sedan and Multipla
$24.95

Also Available:
Model F-600S with manifold
Model F-600C with dual manifold

Order from your dealer, or USE THIS CONVENIENT COUPON

FISHER PRODUCTS

21-8 44th DRIVE • LONG ISLAND CITY 1, N. Y.
8836 B NATIONAL BLVD. • CULVER CITY, CALIF.

Please rush free **FISHER-ABARTH** catalogue describing these, and other systems and accessories. I have checked the system made for my car.

Name_____

Address_____

City_____ State_____

My car is not listed. I have the_____

☐ Alfa Giulietta Sprint	$79.50
☐ Alfa Giulietta Spyder	89.50
☐ Austin Healey 3000 and 100-6	59.50
☐ Austin Healey Sprite	24.95
☐ Borgward, All Models	44.50
☐ Fiat 500 With Heat Riser	34.50
☐ Fiat 600	24.95
☐ Fiat 600, with sports manifold	59.50
☐ Fiat 1200 Sedan	79.50
☐ Jaguar 140M, 150, 150S	89.50
☐ Jaguar 3.4 and 3.8	89.50
☐ Mercedes 190-SL	64.50
☐ MGA	34.50
☐ MGA Twin-Cam	54.50
☐ Opel Rekord and Caravan	47.50
☐ Peugeot 403, Sedan only	54.50
☐ Porsche, all models but Carrera	54.50
☐ Renault 4-CV	24.95
☐ Renault Caravelle	34.50
☐ Renault Dauphine	27.50
☐ Simca Aronde	54.50
☐ TR-3 and TR-2 Complete 303-C System	39.50
☐ Volkswagen, 1956-60 models	44.50
☐ Volvo—PV-444 and 544	27.50

California Residents Add 4% Sales Tax
New York City Residents Add 3% Sales Tax

RACING CYCLE ENGINES

Continued from page 38

(48-70-85-42). There were two overhead camshafts, each with an Oldham coupling in its center and each driven by a hollow crown shaft with bevel gears. The supercharger was a four-vane Centric and was geared to run at 4800 rpm on the 350 and 6000 on the 500; both engines were regularly run up to 8000 crank revs and during record attempts short bursts of 8.3 or 8.4 were permissible. At this engine speed 70 bhp was attained on the 350 and 105 on the five-hundred, both running on methanol with a single 28-mm Amal T.T. carburetor feeding the blower; fuel consumption was equal to about 5 miles per gallon.

While all this supercharged activity was going on in Italy and Germany, in Britain significant strides forward were being made in unsupercharged engine development at the Norton factory. The first Norton racing single, with a single overhead camshaft driven by a vertical shaft and bevel gears, was designed by Walter Moore, but Joe Craig perhaps became, in time, even more famous than the original designer for his development work in connection with intake ramming and tuned exhaust systems.

In this respect and despite the use of a comparatively huge (500 cc) cylinder, motorcycle thinking and realization was way ahead of automobile practice and in 1938, with a mixture of 50 percent 72-octane fuel and 50 percent benzol running unsupercharged, Craig was breaking the 100 bhp per liter barrier for the first time, getting just over 50 bhp from his Senior Norton. In 1937 another camshaft was added and those early twin-cam Nortons were the first to be colloquially known as "double-knockers", a term later to spread all over the world (actually Velocette had adopted twin o.h.c. on their KTT three-fifties the year before). Up to the end of the inter-war peace, the Senior (500 cc) Norton was faster and/or more reliable than any other motorcycle of the time, in spite of its atmospheric induction, the only exception to this rule being the supercharged BMW. In the 350 field, the Velocette, quite similar to the Norton in broad design outline, was supreme until the factory quit racing in 1949.

After a couple of "outlaw years", post-war racing soon settled down again under the classic FIM capacity formulas: 250, 350 and 500 cc (a 125 cc class was added later). Superchargers were banned and, due to the difficulty of obtaining high-octane fuel at the time, a top limit of 72 octane was set; later on this figure was fixed at its present value of 80. (Fuel restrictions on motorcycles were always more stringent than those pertaining to cars.) Naturally, the first races were run with machines of pre-war design and in some cases pre-war construction, exactly as happened in automobile racing; gradually, however, more modern designs began to take hold. Velocette quit while Norton carried on, gradually losing ground with its big single until finally the factory quit making works entries, although the sale and development of the 500 to private entrants continues. This is largely due to the fact that motorcycle racing today has a category which is non-existent on the automobile side. Called "Formula One", it caters to *production racing machines*, of which 25 identical examples must have been built and sold to owners before the model can be homologated for racing.

Norton gradually reduced the stroke and increased the bore until the original 79.6 x 100 figure was pushed to 88 x 82 mm. Revs went up from 6500 to nearly 8000. Another British design, the 7R A.J.S., appeared, quite similar to the 350 Norton but employing chain drive for the cams.

In the early post-war years Guzzi was the most successful make in the 250 cc field with its horizontal-cylinder single, which had only one overhead camshaft. This light, well-balanced design was eventually developed to the point where it was challenging the heavier British 350 singles, and thus in 1950 the factory decided to produce a larger edition. By boring-out they managed to increase displacement to 320 cc, and this machine was almost immediately successful. Later a new series of racers of 250, 350 and 500 cc was designed, quite similar generally to the previous horizontal singles. Another very fast machine was the Guzzi "W", which had two long-stroke cylinders parallel with the frame, the front one horizontal and the rear one canted back at 30 degrees from the vertical — or 120 degrees from the front cylinder.

Now let us run briefly over interim designs before giving an overall picture of racing design today. For 1953 Guzzi designed a 56 x 50 mm water-cooled in-line fuel-injected four which never, apparently, produced the desired results. Shortly afterwards racing motorcycles began to adopt streamlined shells; as these originally enclosed the front wheels, the limiting factor in the overall cycle width became "room for the wheel to steer" and not engine width. Thus wider powerplants became feasible and Guzzi, as a next step to the fast, light and well-balanced singles and twins, designed what is still today the most complicated cycle racing engine ever: a 44 x 41 mm (1.73 inch x 1.61 inch) vee-eight with water cooling and a radiator located at the front of the frame downsweep (shown on pages 36-37). This powerplant was rated at 70-75 bhp at 13,500 rpm, but in actual fact it never really functioned well. A 350 version with only 1.41-inch stroke was designed and possibly built, but the factory relied on its 350 single until it — together with Gilera and Mondial — withdrew from racing in 1957.

A.J.S. built a complicated racing parallel-twin with the cylinder axes almost horizontal, 68 x 68 mm, and twin o.h.c. with air cooling. This was an unlovely design which, due to its enormous amount of spiked fins, became known as the "Porcupine." In spite of its considerable theoretical promise it very rarely worked properly and in its best performance it nearly won a Senior T.T., running out of fuel just before the end.

Gilera already had its supercharged four with the cylinders across the frame. The post-war ban on blowers enabled them to redesign the engine to air cooling, thus obtaining a useful weight saving, and in time this machine became the fastest in the world. When it was withdrawn, the 52 x 58 mm four was turning out some 65 reliable bhp at 11,000 rpm and, furthermore, acceleration was more or less constant at all throttle openings, which was far from being the case with the hot megaphoned singles.

The man who designed the post-war Gilera (or redesigned the pre-war machine, if you prefer it that way) was one Ing. Remor, who went over to the MV-Agusta firm in 1949 and designed for it a machine almost exactly similar to the Gilera. This MV is today the fastest racing machine existing, and the races of 1958 and 1959 were won almost without opposition by the MV *marque*.

In Germany DKW designed the three-cylinder two-stroke, as has been already noted, and NSU was responsible for some extremely interesting work on four-stroke technology. In fact, later on, Mercedes-Benz technicians approached NSU for data on combustion chamber forms, cylinder dimensions, induction pulse forms, etc., and thus it is certainly no coincidence that there are very definite similarities in some of the basic dimensions of the 250 NSU and the 8-cylinder Type W196 Mercedes. The Germans resumed FIM racing in 1951, when NSU raced a 4-cylinder 500 which did not, however, come up to expectations. The original design was scrapped, but the cylinder configuration was retained for a 125 cc single; actually the idea was to carry on development work for a while until a five-hundred four could be erected again using available data. However, the NSU board decided to withdraw from racing after a while and that ended that.

Meanwhile, work on small-capacity engines carried on. The 125 cc NSU "Rennfox" was designed during the winter of '51/'52 and its power output rose from 11 bhp to 14 bhp (112 bhp/liter) in early 1952. It had a single crown shaft operating two overhead camshafts; during development work this shaft was relocated from the right to the left-hand side of the engine.

This "Rennfox" was soon turned into a twin-cylinder 250, which attained some remarkably high power outputs as mentioned in the following table:

	Mark I	Mark II	Mark III
Bore	54 mm	54 mm	55.9 mm
Stroke	54 mm	54 mm	50.8 mm
S/B ratio	1:1	1:1	0.91:1
Power	27 bhp	32 bhp	39 bhp
at r.p.m.	9000	11000	11500
Piston speed, corrected	3200	4000	4100
B.m.e.p., psi	167	163	189

(Continued on page 78)

ACCELERATION
0-100 and stop in 26.2 seconds

TOP SPEED
140 miles per hour

...wings and propeller optional!

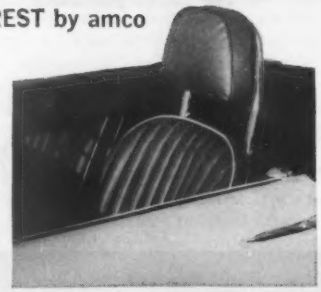
ASTON MARTIN

Distributed in the U. S. by
BRITISH MOTOR CAR DIST. LTD., 1800 VAN NESS AVENUE, SAN FRANCISCO
CHARLES H. HORNBURG, JR., INC., 9176 SUNSET BOULEVARD, LOS ANGELES
IMPERIAL MOTORS INC., 721 GREENBAY RD., WILMETTE, ILLINOIS
J. S. INSKIP, INC., 304 E. 64TH STREET, NEW YORK 21, N. Y.

THE QUALITY LINE OF AUTOMOBILE ACCESSORIES *Insist on* **amco**

The "Monte Carlo" HEAD REST by amco

An exciting new accessory for the sports car owner. Gives you "race-car" styling and a new kind of comfort. A Comfortable head rest for driver and passenger. Also deflects wind at back of neck. Constructed of rigid chrome plated tubular steel. Features a hinged head that will fold under your tonneau cover. Padded head rest is covered with a tough vinyl in choice of black, red, grey, green, or blue. Simple to install. Fits most sports cars. $29.95



windwings from $16.95, sunvisors from $6.95, floor carpets from $14.95, tonneau covers from $19.95, grille guards from $12.95, luggage racks from $22.95, roof racks $29.95, ski racks $22.95 to $29.95.
Upholstery kits from $49.95, head rests $29.95.

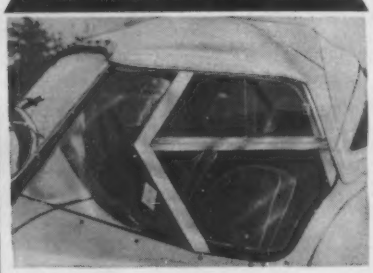
For MGA MGTD MGTF
Healey-100, 100-6
Jaguar, Triumph
Mercedes 190SL, Porsche,
Sprite, Alfa Romeo,
Sunbeam Alpine
and all imported sedans

AMCO DIVISION
AMERICAN CARRY-PRODUCTS, INC.
13148 Raymer St., North Hollywood, Calif.

IN CANADA: Custom Sports Car Accessories
42 Lombard St., Toronto 1, Ontario

SEE YOUR DEALER OR WRITE FOR OUR FREE CATALOG. PLEASE SPECIFY CAR.

TR/OWNERS



replace your present curtains with new 5-way Centurion windows!

Get 63% more visibility, built-in windwing, more cockpit comfort and complete air control! Acclaimed by TR owners . . . all plexiglass and aluminum built to last! Many unique features!
Only $89.95, No installation.

Approved by STANDARD TRIUMPH

CENTURION MOTOR DISTRIBUTORS, CORP.
340 Canal St., New York 13, N.Y., Dept. CD-4
(agents and dealer inquiries invited)

Please send me Free literature on Centurion Windows.
Name .....(Print)
Address .....
City & State .....

***NOW!* a GREASE GUN that's EASY and FUN to USE**

SAVE on Lubrication Costs with the Famous

WANNER
HIGH PRESSURE
GREASE GUN

5,000 LBS. p.s.i. PRESSURE with ONE Hand

Precision-Made in Switzerland

$12
Post Paid

Sorry No COD

WRITE FOR FREE LITERATURE ON

Imported Italian Air Horns by FIAMM, complete set with electric air compressor and relay, $34.50. Imported MALI Fender Mirrors, adjustable, for either side, $5.00. Imported KACO Klamp Lamp, complete with 12 ft. cord, $4.50. New SAFE-HI Seat Belts, meet Gov't. and SCCA specs., 7,000 lb. test, $11.85. Imported AUTOSOL products; famous Chromglanz, chrome and metal polish, removes tar and rust, large tube $.75; Entferner, removes Oil, Grease and Silicones from windshield, plastic bottle, $1.00.

INTERNATIONAL AUTOMOTIVE IMPORTS
BOX 3096, ALEXANDRIA, VA.

(Continued from page 76)

Several design features of this basic engine (actually a 125 cc cylinder x 1 or x 2, according to the displacement class raced in) were common to pre-war practice, such as the dual-shaft drive to the camshafts and the oil pump driven off the bottom of the cam drive. In '53, NSU pioneered the use of batteries with a form of make-and-break distributor in place of the traditional magneto. While this practice was later widely adopted, the four-cylinder 500 and 350 cc MVs still use magneto ignition. NSU was also among the first to use gearboxes with more than the traditional four speeds. In fact the 125 cc Rennfox wound up with six speeds (like the V8 Guzzi) and to save time gearchanging, the riders used to shift by cutting out the ignition (with a button provided on the handlebars) instead of withdrawing the clutch.

The 1954 250 Rennmax was altered to a single shaft to drive both camshafts, and in spite of the relatively narrow included valve angle of 50 degrees, valve sizes were quite large, viz. 1.53 inches inlet diameter and 1.34 inches exhaust diameter.

The withdrawal of the three major firms, Gilera, Guzzi, and Mondial, at the end of 1957, considerably changed the face of motorcycle racing, making matters less interesting technically if perhaps more even in a sporting sense. The private owner can hope to finish within the first three in a major Grand Prix today, whereas in 1957 he would be lucky to come in among the first seven or eight. However, the point is that the Gilera fours, 350 and 500 cc, the Guzzi V8 and other remarkably interesting designs were all pushed into sheds and left there, leaving the field to the MV fours and other singles and twins.

In the 500 cc class, therefore, MV has been completely unopposed, as also happened in the three-fifty category. Both fours employ, of course, the same basic design, with the cylinders in line across the frame and well canted forward, to allow better cooling of the cylinder head and to bring the crank sprocket closer to the final drive. There are twin overhead camshafts driven by a central train of gears, and ignition is by magneto. Cylinder measurements are 47.5 x 49.4 mm for the 350 and 53 x 56.4 mm for the five-hundred, with respective claimed power outputs standing at 45 (at 11,000 rpm) and 70 (at 10,500 rpm) bhp. Primary drive (from the engine to the gearbox) is by gears, and final drive by chain. Top speed is probably in the region of 170 mph.

The MVs' main challengers have been Norton in the 350 and 500 classes, plus A.J.S. in the smaller division only. All three machines are completely orthodox in design and derive their very useful turn of speed from painstaking factory development work and equally painstaking tuning by private owners, such "tuning" frequently extending to making up completely special frames in which to fit Norton engines. (The A.J.S. "Boy Racer" has been the subject of less drastic mods.) The Nortons continue with twin-o.h.c. operated by a vertical shaft and a train of spur

(Continued on page 80)

CAR AND DRIVER INFORMATION SERVICE

Here's how you can get additional information, promptly and at no charge, concerning all imported, sports and compact cars, as well as equipment and accessories advertised or described editorially in this issue.

On the coupon below, just circle the numbers of cars and equipment in which you are interested, and mail directly to Car and Driver. We will be happy to pass your request for information along promptly to the manufacturers and distributors concerned.

SPORTS & IMPORTED CARS

1. Abarth
2. A.C.
3. Alfa Romeo
4. Alpine Tour de France
5. Alvis
6. Arabella
7. Arnolt-Bristol
8. Aston Martin
9. Austin
10. Austin-Healey
11. Autobianchi Bianchina
12. Auto-Union
13. Bentley
14. Berkeley
15. BMW
16. Bocar
17. Borgward
18. Bristol
19. Chevrolet Corvette
20. Citroen
21. DAF
22. Daimler
23. Datsun
24. DB
25. Devin
26. DKW
27. Elva Courier
28. English Ford
29. Facel Vega
30. Ferrari
31. Fiat
32. Ghia
33. Goggomobil
34. Gordon
35. Hansa
36. Hillman
37. Humber
38. Innocenti
39. Jaguar
40. Jensen
41. Lancia
42. Lea-Francis
43. Lotus
44. Maserati
45. Mercedes-Benz
46. Metropolitan
47. MG
48. Morgan
49. Morris
50. NSU Prinz
51. Opel
52. Panhard
53. Peugeot
54. Porsche
55. Renault
56. Rolls-Royce
57. Rover
58. Saab
59. Sabra
60. Simca
61. Singer
62. Sunbeam
63. Taunus
64. Toyopet
65. Triumph
66. Turner
67. Vauxhall
68. Vespa
69. Volkswagen
70. Volvo

DOMESTIC CARS

71. Buick Special
72. Chevrolet Corvair
73. Chrysler 300 G
74. Dodge Lancer
75. Ford Comet
76. Ford Falcon
77. Ford Thunderbird
78. Lincoln Continental
79. Oldsmobile F-85
80. Pontiac Tempest
81. Rambler
82. Studebaker
83. Valiant

ACCESSORIES, EQUIPMENT & PARTS

89. Castrol Oil, Inc.
90. Charmant Imports
92. Dietz Engineering Co., O.W.
94. Ducommun Co., M.
100. Fisher Products
103. Iskenderian, Ed
104. James Auto Specialties
108. Lucas Electrical Services
110. Overseas Motors
112. Plastics Dynamics
117. Southwest Imported Auto Parts
121. Tec Auto
123. Wilco
147. Alexander Engineering Co.
148. Allard Motor Co.
149. American Carry Products
150. Arnolt Corp.
151. Bakers Worldwide Auto Parts
152. Barker Motors
153. Centurian Motor Products
154. Derrington Ltd., V.W.
155. Electric Autolite Co.
156. Geon International
157. Haan, Vilem B.
158. International Auto Imports
159. Jay's Sports Car Accessories
160. Judson Research & Mfg. Co.
161. Kendall Refining Co.
162. Kensington Products
163. Lev-Lite Electronics
164. MG Mitten, Inc.
165. Moon Equipment Co.
166. Nor Cal
167. Purdy Opticians
168. Quaker State Oil Co.
169. Ram-Cote Products
170. Rosemont Products
171. Royze, Inc.
172. Sports Car Manuals
173. Stewart-Warner Corp.
174. Sturtevant Co., P.A.
175. Sullivan Speedometers
176. Vigilanti Enterprises, Inc.
177. White & Bagley Co.

TIRES

125. Continental
126. Dunlop
127. Englebert
128. Firestone
129. General
130. Goodrich
131. Goodyear
132. Metzler
133. Michelin
134. Pirelli
135. U.S. Royal

OTHERS

140. Don Allen Chevrolet
141. Robert Bentley, Inc.
142. Malcolm Konner Chevrolet
143. Marken Ltd.
144. Mosko, Aaron
145. Racers
146. Riverside Records

USE THIS COUPON TODAY FOR FREE INFORMATION ON PRODUCTS DESCRIBED IN THIS EDITION!

4/61

TO: CAR AND DRIVER
P.O. Box 214
Village Station
New York 14, N. Y.

Indicate total number of codes circled_____

Please arrange to have additional information sent to me on items whose numbers I have encircled.

1	2	3	4	5	6	7	8	9	10	11	12	13	14
15	16	17	18	19	20	21	22	23	24	25	26	27	28
29	30	31	32	33	34	35	36	37	38	39	40	41	42
43	44	45	46	47	48	49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80	81	82	83	89
90	92	94	100	103	104	108	110	112	117	121	123	140	141
142	143	144	145	146	147	148	149	150	151	152	153	154	155
156	157	158	159	160	161	162	163	164	165	166	167	168	169
170	171	172	173	174	175	176	177						

Name_____

Address_____

City_____ Zone____ State_____

FIBERGLASS TOPS

Why have a canvas top, when you can replace it with a custom-made plastic hard top and sliding side panels that will wear forever?

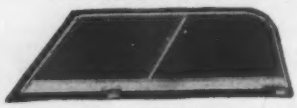
Corvette top shown available for all models

Top & sliding side panel units available for the SPRITE, MGA, TRIUMPH, MG-TD & TF, JAGUAR, PORSCHE & AUSTIN-HEALEY thru 56 at unit price.

Tops not requiring side panels available for the JAGUAR XK-150, AUSTIN-HEALEY 57-61, ALFA ROMEO, ALPINE SUNBEAM, FIAT, THUNDERBIRD, and all other sports cars.

GUARANTEED FIT, and all weather protection. Prompt deliveries.

Also Sliding Side Panels



*AUSTIN-HEALEY SPRITE panel shown

PORSCHE SPEEDSTER	PER SET	@	$52.00
AUSTIN-HEALEY SPRITE	PER SET	@	52.00
*AUSTIN-HEALEY	PER SET	@	58.00
MGA	PER SET	@	58.00
TRIUMPH	PER SET	@	72.50
JAGUAR XK 120 & 140	PER SET	@	72.50
MG-TD & TF	PER SET	@	72.50
for rear panels add			18.00

SPECIFY MODEL AND YEAR OF CAR when writing for free brochure, on tops or panels.

Prices F.O.B. plus taxes
50% on order—Balance C.O.D.
Dealers Inquiries Invited
Write for our new prices and designs for 1961.

PLASTIC DYNAMICS SALES CORP.
Engineers & designers of reinforced plastics
432 E. WEBER AVE. COMPTON 2, CALIFORNIA
NE 6-4460

HAVE PORSCHE WILL TRAVEL

Personalized cards printed with this slogan. Also available: Triumph, MG, Healey, Corvette, T-Bird, Sprite, Volkswagen, Ghia, Jaguar, Alfa, Saab, Volvo, Renault, Alpine, Ferrari, Go-Kart, Hotrod, Cycle, Scooter, Goodies, Dragster, Sportscar. Calling cards, (illustration approx. 1/3 size) printed with your full Name, naming your car, and illustration of Sports, Foreign car, etc. Send $1.00 for 25 cards; $2.50 for 100. Phone number printed—25c extra. LEV-LITE ELECTRONICS, 144 WOLFSWAMP RD., DEPT. 11, Longmeadow, Mass.

(*Continued from page 78*)

gears, with exposed hairpin valve springs, exposed-chain primary drive to a separate gearbox (Continental machines use an integral engine-gear unit), and magneto ignition by Lucas. Gearboxes have four speeds. A.J.S. specifications are similar to Norton's except for the use of a chain to drive the camshafts. Bore and stroke figures and claimed power outputs are as follows: Norton Manx 350, 76 x 76.6 mm, 38 bhp at 7800 rpm. Norton Manx 500, 86 x 85.6 mm, 50.5 bhp at 7000 rpm. A.J.S. 350 "7R", 75.5 x 78 mm, 38.8 bhp at 7800 rpm. These figures are for the standard machines; late-model factory Nortons had oversquare cylinders and higher power outputs.

In the 250 cc field there is more variety. Basically, MV uses the basic cylinder dimensions of the four-cylinder five-hundred for a single-cylinder 125 and a 250 parallel-twin. In both cases o.h.c. drive is by gears and there is a five-speed gearbox with a wet multi-plate clutch. The 125 develops 20 bhp at 12,500 rpm and the 250 35 bhp at 12,000; there is also a single-cylinder two-fifty with 32 bhp at 11,000 rpm. Unlike the fours, however, the smaller MVs use battery ignition with make-and-break distributors.

The Ducati make has been chiefly noted of late for its use, successful though not overwhelmingly so, of desmodromic valve operation through three camshafts, two of which bear directly on the valve stems (through fingers, of course) while the central cam kicks both valves shut again, through rockers whose outboard arms bear on collars on the valve stem. This mechanism has worked well in the 125 single and more recently in the 250 twin, both of which share 55 x 52.5 mm cylinders; claimed power output for the 125 is 18-20 bhp at 12,000 revs. While both these little machines are fast, they are not so fast as the MVs which use conventional valve springs. Norton is also working on a "desmo" layout.

Apart from 250 cc four-strokes like the Morini and the remarkable 14 500 rpm Japanese Honda, considerable technical interest attaches to the East German MZ firm, which has been obtaining some remarkable results with two-strokes—a 125 single and a 250 twin, again using standard cylinder dimensions to cut development costs (and trouble). In fact, MZ seems to be carrying on the good work started by DKW, although its designs are quite orthodox with conventional vertical cylinders. Claimed power outputs for the 125 and 250 are, respectively, 20 and 38-40 bhp, figures which seem a little doubtful in practice, although as far as two-strokes go, the MZ engineers would seem to be at least as far ahead as anybody else in the world today. A semi-circular plate controls admission of the charge to the crankcase ("rotary inlet valve") and in the matter of port design MZ has been working very hard. They have come up with a third transfer port fed through a hole in the piston skirt, which they say gives excellent results although it is not yet fully developed.

on sale April 4:

GIANT AUTO SHOW ISSUE

of Car and Driver

(formerly Sports Cars Illustrated)

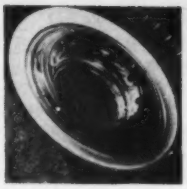
We might say that in many aspects, notably breathing, motorcycle design is and always has been ahead of car practice. Simpler and cleaner intake tracts and fewer cylinders have enabled very high bmep figures to be attained, although this bmep is not sustained over a very wide rpm range. Thus five- and six-speed gearboxes are common practice and one make even used a seven-speed box at one time. With only one or two cylinders, they have been able to use battery ignition and thus avoid magneto saturation at very high rpm (a similar scheme was used on the V16 B.R.M. car).

While steering and stability problems are mostly specific to two-wheeled vehicles, racing-car designers would in many cases benefit from a close study of motorcycle engines.

—FBK

more and ***more***

motorists are finding that..



ROAD RESEARCH REPORT: AUSTIN-HEALEY SPRITE

Continued from page 60

public roads with steering any quicker. The least movement of your hands changes the Sprite's course, which becomes noticeable if you throw a quick shift in the middle of a fast bend. Yet the steering forces are always very moderate indeed, a factor perhaps in the Sprite's extensive popularity with women.

NIGHT DRIVING

The Sprite's headlights are at full legal height, as any stylist will quickly remind you. American sealed-beam units are used on cars shipped over here and they are easily adequate to the Sprite's performance. The high beam indicator is at the bottom of the speedo dial, and doesn't annoy you at night, but the turn indicator light is much too bright and gets you right in the eyes. Why a smaller bulb isn't used here is beyond our comprehension. We found that a small piece of masking tape placed over it at dusk when we first turned on the lights was an eye-saving trick that paid dividends in destroying dazzle later on.

ENGINE PERFORMANCE

Our test was performed in winterlike weather so we had excellent opportunity to check the Sprite's cold-start characteristics. Even with the temperature down to 20° F, it would start promptly and run steadily provided you pulled the choke knob all the way out. However, even with a piece of cardboard covering three-fourths of the radiator, continued use of the choke was required for at least the first mile and the water temperature needle wouldn't move for one or two more.

The importers recommend premium gas so we used that for our acceleration runs but for normal driving we found that regular gave no trouble at all. No adjustments were made to the carburetors or ignition during the test.

Though the idle and "green-line" speeds are a bit on the high side at 1000 rpm for both, the Sprite engine doesn't act up or behave fussily in any way. A pint of oil was used, but only after the always tiresome (for the engine) acceleration runs. In fact, other than for photography, the only reason the hood was lifted was to show someone how it was done. Our only concern was with the oil pressure gauge which consistently read about 45 psi instead of the specified "60 or higher."

Like the brakes, the clutch is operated hydraulically. The clutch itself is tiny, only 6¼ inches in diameter, so the forces are quite low. Perhaps there was some stickiness in our clutch cylinder; we could certainly feel that some force was needed, yet the mechanism seemed devoid of "feel."

ACCESS TO THE ENGINE

What the Sprite misses in the way of a trunk lid it more than makes up for with engine access. The entire front body structure opens up, exposing both engine and front suspension. To keep everything else reasonably clean there are two very spartan-looking sub-fenders. The hood is unlatched by reaching behind the license plate on the front bumper below the grille and twisting the tee-handle with the left hand while releasing a safety catch with the right. Then you take a firm grip (and a deep breath) and lift the heavy structure up until the telescoping struts engage their ratchets.

Everything under the hood is then exposed for checking or adjusting, but there are two drawbacks. If it's been raining, then there is a good chance that, as you bend awkwardly under the nose (it's such a small car, even when the nose is up, it's low), you'll get water dripped on you by the upraised body. The other is that tall people will find it awkward to bend that low. Since the fender sides come up too, your access is limited mainly to the front where the under edge of the nose hangs low enough to make it awkward to avoid touching it with your back.

The dipstick is back between plugs #2 and #3 and lies quite close to the warmth of the cylinder head, but not, fortunately, anywhere near the exhaust manifold. It's

(*Continued on page 82*)

NEED FOREIGN PARTS . . . ?

Replacement parts for over 40 makes carried in stock. Only parts house in the Southwest devoted exclusively to foreign parts.

OVERNIGHT DELIVERY TO ANYWHERE

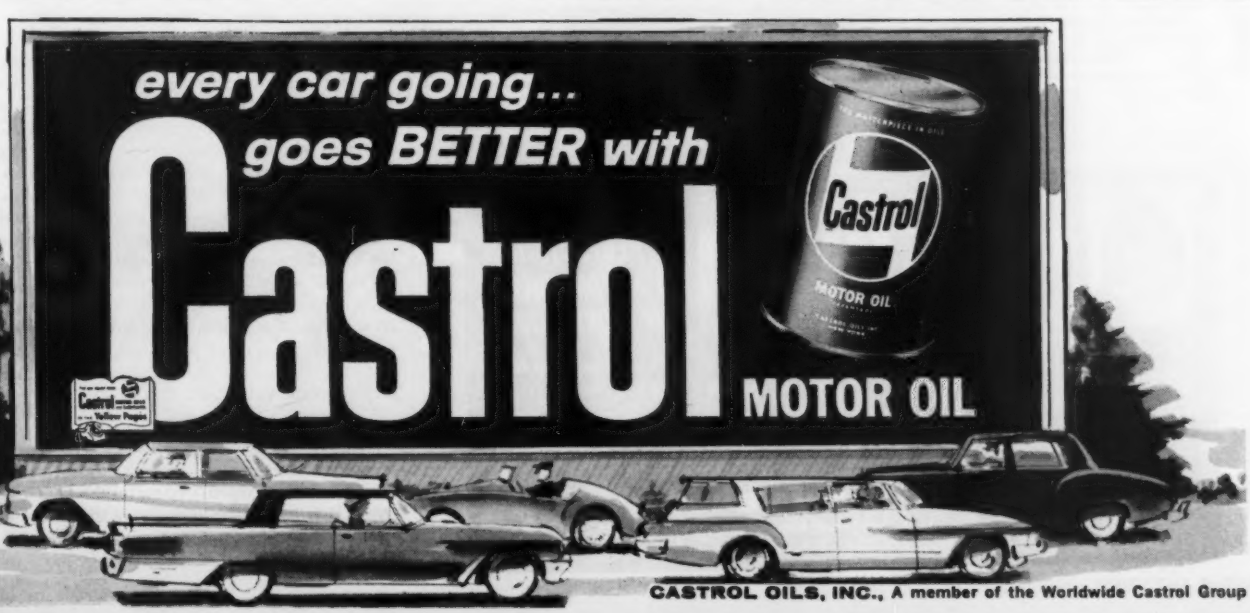
SOUTHWEST

IMPORTED AUTO PARTS

1810 Texas Ave., Box 1314, Houston 3, Texas
CApitol 7-4264 TWX HO-836

TRIUMPH OWNERS!

NOW AVAILABLE! PRICE $2.00
A TUNE UP MANUAL FOR THE TRIUMPH SPORTS CAR TR 2/3. SIZE 8½ x 11. 60 PAGES ILLUSTRATED. DESCRIBES AND ILLUSTRATES AN EASY TO FOLLOW TUNE UP PROCEDURE AND OTHER MAINTENANCE TIPS. ORDER FROM:
SPORTS CAR MANUALS CO.
P.O. BOX 215
SPRINGFIELD, VIRGINIA

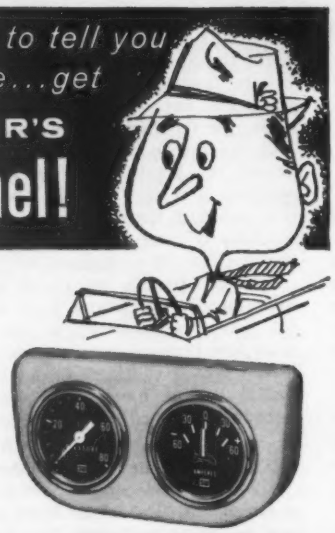


CASTROL OILS, INC., A member of the Worldwide Castrol Group

Don't wait for warning lights to tell you you're already in trouble... get

STEWART-WARNER'S

"twin-gauge" panel!



At-a-glance, the gauges in a Stewart-Warner "Twin-Gauge" Panel warn you of low oil pressure or inadequate generator charging rate—help you avoid trouble. Tell you much more than warning lights.

Attractively styled "Twin-Gauge" Panels are available in choice of panel finishes with Black & White or "Twin-Blue" face dials.

See them at your service station, garage, auto dealer or automotive accessory store. They offer security that costs so little, but can save you so much!

Symbol of SW Excellence

INSTRUMENT DIVISION

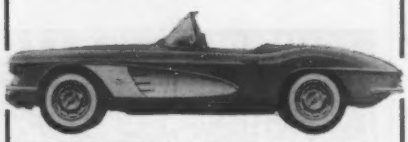
STEWART-WARNER CORPORATION

Dept. AJ-41, 1840 Diversey Parkway, Chicago 14, Ill.

MALCOLM KONNER CHEVROLET

New Jersey's Headquarters For New

CORVETTES



230-245-270-275-315 H.P. & Supercharged Modification. Special Equipment, Roll Bars etc. All Colors. Many Fine Used Corvettes & Foreign Cars.

Call or see Bob Wasserman

FUEL INJECTION SPECIALISTS
Try our special sports car service

MALCOLM KONNER CHEVROLET

America's Leading Corvette Specialist

473 BLOOMFIELD AVE. • CALDWELL, N. J.

Phone CApital 6-6666

UNI-SYN

Multiple Carburetor Synchronizer

Professionals and amateurs are using this instrument the world over. The only positive way to synchronize multiple carburetors, side draft or down draft.

Price p'pd. $9.95

Cal. Residents add 4% Sales Tax.

No CODs.

Dealer and jobber inquiries invited—

ROYZE, INC.

1010 No. LaBrea, Inglewood, Calif.

for imported car parts and accessories

• direct importers •

Dealers may request catalog covering many original and replacement lines for all imported cars.

maserati

THE STANDARD OF PERFECTION IN AUTOMOBILES THE WORLD OVER

AVAILABLE AT THE FOLLOWING DEALERS

JOHN S. NORSYM

4129 South Artesian Avenue, Chicago 32, Ill.

GRAND PRIX ENGINEERING

30 Gross Street, Norwalk, Conn.

RALLYE MOTORS INC

46 Sea Cliff Avenue • Glen Cove, N.Y. • OR 1-4622

3500 G. T. illustrated. Also available in Convertible & Competition cars.

(*Continued from page 81*)

hard to see the hole in the block to replace it because you stand so far away.

The "electrics" and the suspension's grease fittings are unusually easy to reach. In the case of the latter, the most important nine of the 12 total fittings on the car can be lubricated by the owner at home without aid of a hoist. It's better though to lube suspension bushes with the car's weight off its wheels so the grease can flow where the load is greatest, so use of the car's jack is recommended if money-saving greasing-at-home appeals to you.

TRANSMISSION

The ubiquitous BMC A-series gearbox (cars using it range from Lotus to Austin A40) has four forward speeds, the upper three being synchronized. The gears are indifferently spaced as second gear could usefully be moved much closer to third without getting too far from first. The shift is very stiff when it's new, but by the time you're ready to trade the car in for a new one it's as smooth as silk and a real delight to use. The synchromeshes are easily beaten, especially when the near-new shifting mechanism is so tight that smooth, delicate shifts are nearly impossible.

While it is true that eventually the mechanism does wear in, it would be fine if the manufacturing process could be sharpened up so that gear-shifting could be a pleasure right from the very day you drive away. If we were trading in an old Sprite for a new one, we'd have the service department swap transmissions for us so we wouldn't have to break in another.

With standard 4.22 to one gears in the rear axle, the Sprite is almost perfectly geared for top speed. We achieved 79 mph with the soft top and side curtains in place; with the hardtop's smoothness, 80 itself should be possible. If so, it would be at exactly 5200 rpm, the speed of peak power.

If tip-top speed isn't your main concern, there are alternative ratios available. The 3.73 to one gearset would cut the acceleration, increase the amount of gear-shifting necessary and reduce the engine revs and noise while cruising. If a *vast* increase in power were made, then and only then would this big change in gearing actually result in the theoretically higher top speed one expects with a "longer" gear.

For better acceleration, there are two "shorter" gearsets available, 4.55 and 5.38. The former would be fun around town, yet still usable on the open road, being only 8% shorter than the stock 4.22 set. The latter is strictly for racing on short, twisty circuits or scaring the opposition in gymkhanas. Its red line (6000 rpm) would come up at only 72½ mph, and discretion would be in order to avoid blowing up your engine by literally over-revving in top gear.

On the other hand, over-revving will not be a problem with the 4.55s, as 80 mph, if you could achieve it, would equal 5600 rpm, past the power peak but short of the red-line. Of course, a long down-hill grade might tempt you . . . .

CONSTRUCTION

The outstanding technical feature of the Sprite is the use of integral body-frame design with an open two-seater body. Generally this technique is used on coupes and sedans where the roof and windshield posts play an important stress-carrying part in

making up a stiff, box-like structure with which to replace the separate frame. As usual with such designs, the welded assembly of sheet metal stampings looks in many places just like a series of box-section members.

The Sprite's suspension mounts are joined to one another by two U-shaped arrays; that is, the front cross-member caps a small U which passes each side of the engine and gearbox (also carrying them) and runs into a median cross member below the driver's knees. This cross-member extends the full width of the car, serving as a suitable jacking point, complete with sockets. Near its extremities, under the door sill, a pair of box-sections run aft, sprouting upward just as they end to make tall mounts for the trailing quarter-elliptic springs and, above, locating arms for the rear axle.

A part of each box-section is, of course, the floor pan which extends fully across the car, enclosing the propellor shaft. (The front U-joint is greased from inside the cockpit through an awkwardly small hole in the tunnel.) The rest of the sub-frame, consisting of some 50 stampings, is welded together to make a single unit; this is then shipped to another factory where all body panels are welded or hinged in place.

So much for the sheet-metal side of things. The machinery of the Sprite makes extensive use of components that were already in production when the Sprite was first built (March, 1958). The engine is used in single-carb style in the Morris Minor and Austin A40 and, in very modified form, in the 850 mini-twins. The transmission and rear axle gears are the same as in the first two cars. The front suspension was taken straight off the Austin A35, since succeeded by the A40, and the rack and pinion steering is from the Morris Minor. The only mechanical "exclusive" seems to be the use of trailing arms and quarter-elliptic springs, which are ideal for integral construction since the box-section suspension reinforcements to the floor can be so much shorter. Only body panels are required aft of the axle and they are self-supporting. A drawback evidently is the difficulty in obtaining ample wheel travel for we found the Sprite would bottom out readily at the rear.

An impressive fact about this design is that after three years of production the only serious modification has been in the method of attaching the top to the windshield frame, and that was made shortly after introduction.

OWNER'S TIPS

In checking with friends and relations who own and drive Sprites we came up with a surprisingly short list of tips, which again testifies to the basic soundness of the original layout.

One is to apply glycerin, graphite or, if they aren't available, Vaseline to the felt slides of the sliding pane sidescreens. They will then work smoothly and more easily.

As to getting under the hood, one earnest recommendation is always to set the auxiliary hood stay (the one which folds across the front of the radiator) rather than trusting wholeheartedly to the telescopic

(*Continued on page 84*)

YOUR COPIES OF

CAR and DRIVER

ARE VALUABLE!

KEEP THEM NEAT . . . CLEAN . . .
READY FOR INSTANT REFERENCE!

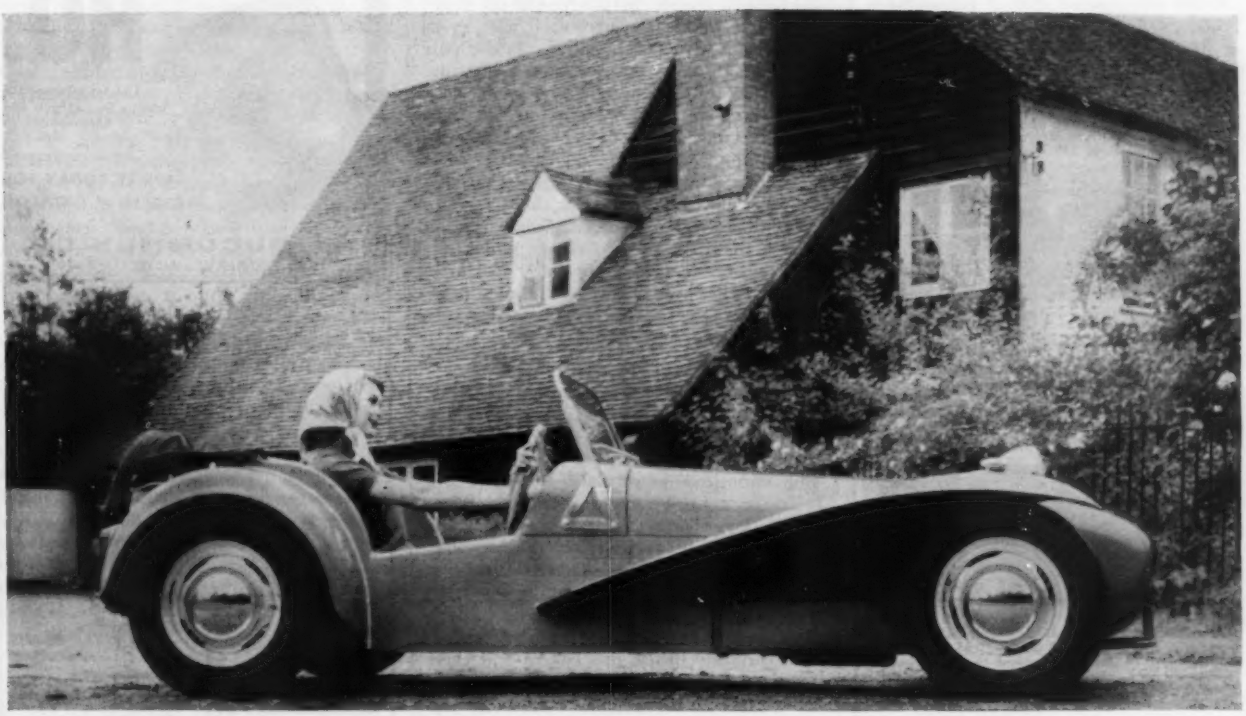
Now you can keep a year's copies of CAR AND DRIVER (formerly SPORTS CARS ILLUSTRATED) in a rich-looking leatherette file that makes it easy to locate any issue for ready reference.

Specially designed for CAR AND DRIVER, this handy file—with its distinctive, washable Kivar cover and 16-carat gold leaf lettering—not only looks good but keeps every issue neat, clean and orderly.

So don't risk tearing and soiling your copies of CAR AND DRIVER always a ready source of valuable information. Order several of these CAR AND DRIVER volume files today. They are $2.50 each, postpaid—3 for $7.00, or 6 for $13.00. Satisfaction guaranteed, or your money back. Order direct from:

JESSE JONES BOX CORP., DEPT. CD
Box 5120, Philadelphia 41, Pa. (Established 1843)

Lotus Seven America!



Latest expression of the Lotus theme – the Lotus Seven America is the outstanding light sports car in the British tradition

Manufactured by **Lotus Cars, Ltd.,** Delamare Road, Cheshunt, England

CHEVROLET CORVETTE
by Don Allen
AMERICA'S CORVETTE HEADQUARTERS
Consult with Don Allen's Corvette Specialists. Choose from the largest selection in the East.
ALL OPTIONS • ALL COLORS IMMEDIATELY AVAILABLE
Complete Sales, Service and Parts Facilities.
Deferred Payment Facilities
Top Allowances on All Trades
"Famous For The Finest"
GENERAL MOTORS BUILDING
BROADWAY at 57th STREET
NEW YORK CITY
Connecticut Showrooms:
SEYMOUR CHEVROLET
231 W. Putnam Greenwich

BARKER MOTORS
2291-S Fairfield Avenue Bridgeport, Conn.

CARPETS: Custom made of durable viscose. Transmission tunnel and floor pieces: red or black

MG TD	$19.95
MG A	29.85
Sprite	29.85
TR 2-3	29.85
Jag XK 120, 140	38.50
Inquire about others	

SHOP MANUALS: All genuine factory issues as used by our own Service Dept. ..... $12.50 each

MG A	Borgward
Sprite	MG TD/TF
Morris	
Aust.	Healey Specify
model	

"WIND WINGS" by Amco. MG TD-TF, MG A, TR 2-3, Fiat 600 & 1100, Sprite, Alpine.. $16.95 pr. Aust. Healey 100, 106, 3000, Jag XK 120, 140, 150, Alfa, Porsche Cpe., 190 SL K-Ghia.... $19.95 pr.

SUN VISORS by Amco, dark green transparent plexiglass; MG TD-TF, MG A, TR 2-3, MG A Coupe, Sprite, Aust. Healey 6..... $6.95 ea. Aust. Healey 100, Jaguar 120, 140, 150..... 7.95 ea.
RUBBER MATS: Protect your carpets. Contour fitted in black with fully beaded edges. MG TD, TF, MG A, Aust. Healey 100 & 106, TR 2-3..... $10.95 pr.
SCUFF PLATES: Ribbed heavy duty aluminum will not rust or tarnish.

DOOR PLATES for MG A, Sprite, TR 2-3, Aust. Healey 6, Aust. 850 $4.95 pr.

GAS PEDAL PLATES for side of transmission tunnel—MG A, Sprite, Aust. Healey, TR 2-3 $2.95 ea. or order universal plate for other models.

THRESHOLD PLATES for MG A, TR 2-3, Porsche, Sprite ..... $4.95 pr.

CHROME DOOR PULL for MG A or TR 2-3, $3.95 pr.

20% with order, balance COD or send full amount and we'll pay postage. All items satisfaction guaranteed or full refund.

(*Continued from page 83*)

self-latching props on each side. If that heavy hood drops on you accidentally, you'll be stuck for the day.

While you're under there checking the oil, it might be a good idea to check the tightness of the two bolts mounting the oil filter to the block.

If you have trouble with overheating on hot summer days, you'll find that moving your front license plate down or to one side will allow lots more air to the radiator.

In the wintertime when you need to use the choke for so long, you can out-fox its overly strong return spring by putting a nickel (5¢) edgewise between the knob and the dash. If you're the type that has a "church-key" on your keychain, it has just the right width too. (But you need a long keychain.)

About the stiff gear change, the universal advice is this: the more you use it, the faster it'll break in. But be careful with your brute strength, as too violent an effort will overload and "beat" the synchromesh cones.

Finally, there is the matter of clutch adjustment. There should always be 5/32-inch free play at the pedal itself. The normal adjustment is at the pedal end of the pushrod to the master cylinder. If you have used up all the adjustment there, lengthen the fixed-length pushrod to the slave cylinder by welding on a piece of screw stock, using trial and error to get the right length by cutting or grinding off some of the extension.

OPTIONS GALORE

Most any sort of person is likely to buy a Sprite; what makes the Sprite so charming is that it can be "arranged" to suit the individual, personal desires of any of them. You may keep it virtually stock as the center couple in the photo on pages 58-59 have done; you may fit it with every conceivable device for rallying as the pair on the left are about to, or you may use it as your foundation for going racing on a limited budget as the group on the right intend. The factory offers a wide range of options and what they don't offer, somebody else does. Marion Weber's firm, who lent us all those items in the left foreground, is a leader among the many specialists in the latter sort of thing. What they offer is well advertised (in C/D, of course) so we will dwell only on those items which, though offered by the factory, are harder to find out about.

STURDY ENGINE

If auto factories have learned anything from hot-rodders, it's that a given engine may be rearranged to have any one of several characters. It may be a sweet, docile and unnoticed powerplant for little old ladies or a fire-breathing, defiance-screaming packet of power for a racing car or anywhere in between; in every case with appropriate smoothness and reliability. The Sprite's engine is a good example of a halfway point in such a range. The Sprite's manufacturers, the British Motor Corporation, certainly utilize this system and their A-series engine is a marvelously versatile unit. The Sprite version of it with 48 SAE bhp or 43 net is only a moderate boost from the basic Morris version's 37 (net).

At the other end of the scale is the Formula Junior version, such as powered

LAST OF THE RED HOT ALFAS!

See Details on Page 26
Feb. Issue—Sports Cars Ill.

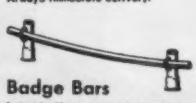
FOR SALE
At Tremendously Reduced Price, Has 1960 Title
Cost $40,000 To Build

Contact
AARON MOSKO
ITALIAN MOTORS
501 East 17th Avenue
Denver, Colorado

STOPWATCH HQ.

Largest selection of quality Stopwatches and Chronographs in America!
All Makes Repaired
WRITE TODAY FOR BIG NEW CATALOG
M. DUCOMMUN CO.
580 FIFTH AVE., NEW YORK 36

Tie Bar $2.95
MG Cuff Links $4.95

Key Fob $1.50
Ever popular personal accessories, for most cars, in brilliant jeweler's glass enamels and chrome.
The largest stock of imported metric and whitworth tools in the East. Always immediate delivery.

Badge Bars
Individually designed badge bars for most makes and models cars from vintage Rolls-Royce to VW. Plain models, $12.95
Spotlamp-mounting, $18.95

Stoneguards
Headlamp $10.50/pair, in sizes from 6" Corvette to VW ovals.
Spotlamp $7.95 each.
Specify make and model.
All prices postpaid. Send for free illustrated catalogue.
WILCO Box 1128, Rochester 3 N Y

Charlie Kolb's championship Elva last year. It is rated at over 70 bhp SAE.

Few Sprite owners may want *that* specialized an engine under their hood, but if they're interested in more than stock output, the best dollar's worth of option they can get is part number AKD1021A. That's the Sprite Special Tuning booklet which lists all the options available and describes how to group the engine ones for varying increases of power. They list five stages; in terms of net horsepower (i.e., with accessories) they increase the peak output by 2, 4, 7, 9 and 11 or 12 bhp respectively, with the speed going up to about 5800 rpm.

A .315-inch lift competition camshaft jumps the overlap from a mild 15° to a still hardly hair-raising 37°. If you want every last revolution before valve bounce (and who doesn't?), a set of inner valve springs raises the red-line to 7000 rpm.

While the engine parts may seem rather limited, the booklet describes in great detail how to achieve the five stages of performance. Of course it's not merely a matter of installing parts; considerable careful hand reworking must be done to the cylinder head.

PERFORMANCE OPTIONS

Don't get carried away by the Tuning Booklet's list of 86 items because you cannot get each and every one of them here in the States. At this writing, Hambro does carry 25 of the 86, seven of them under different part numbers. Better yet, they also list 15 items that *aren't* in the booklet. Everything they have is shown on page 62, though we have condensed the array somewhat.

As we go to press, we have been informed that a simpler disc brake conversion is being introduced by the Donald Healey Motor Co., Ltd. of Warwick, England. For $126 plus shipping and duty, you get two Lockheed discs and calipers for the front wheels. Order direct, not through channels.

The close-ratio gearbox may be bought over the counter or you can rebuild your own by buying only the parts you need. Either way, it's an option we recommend. To give a comparison, the Drive Train specs include the figures for the close-ratio box below the standard one. If you're serious about road-racing, nothing will improve your "skill" as suddenly and impressively, unless it's the stiffening group of suspension parts (anti-roll bar, stiff springs and stiff valves for your shocks). It was used on the now-famous Sebring Sprites (along with a few other well-chosen items — namely everything on Hambro's list) and it turns a complete fun car into a serious piece of racing iron. Flat cornering, we mean *flat*, an engagingly snarling engine up front with a sharp, crackling exhaust just behind you, and if you top it off with a handsome wood-rimmed steering wheel, well, you might as well be Fangio. Such a car is a long way indeed from the docile car you buy off the showroom floor, but that's a distance the Sprite can easily reach. As our lead photo indicates, it's only one of the directions you can choose, for the Sprite is a truly sound foundation for economically building your very own, thoroughly personalized sports car. If you prefer a bread-and-butter Sprite to one with jam, you'll still find it tasty. —*C/D*

LET CAR and DRIVER HELP YOU BUY OR SELL YOUR CAR, EQUIPMENT AND ACCESSORIES FOR AS LITTLE AS $1.50!

Every month hundreds of classified advertisers use our Sports Car Market Place. Why? Because literally thousands of cars and pieces of equipment are bought and sold here each year.

Now you, too, can buy or sell your sports or imported car—your equipment and accessories—by inserting a small classified ad in CAR AND DRIVER'S Market Place for as little as $1.50 (10 word minimum—15¢ per word).

You can make your ad more appealing, too, with a photograph of the item you're selling (and for only $15). What's more, C/D is the only magazine to redesign its classified pages . . . listing cars by make and giving your ad more effective display!

So, whether you want to buy or sell sports cars or equipment, accessories or imported cars, let the Sports Car Market Place do it for you now!

Act Now! Take advantage of the largest sports and imported car readership available (over 172,000). Simply fill out the order form below, enclose payment and mail today to: **MARTIN LINCOLN, Classified Advertising Manager CAR and DRIVER One Park Avenue, New York 16, New York.**

JUNE ISSUE CLOSES MARCH 10th.

(1)	(2)	(3)	(4)	(5)
(6)	(7)	(8)	(9)	(10—$1.50)
(11—1.65)	(12—1.80)	(13—1.95)	(14—2.10)	(15—2.25)
(16—2.40)	(17—2.55)	(18—2.70)	(19—2.85)	(20—3.00)
(21—3.15)	(22—3.30)	(23—3.45)	(24—3.60)	(25—3.75)
(26—3.90)	(27—4.05)	(28—4.20)	(29—4.35)	(30—4.50)

☐ Please insert picture with ad. Photograph enclosed.

Total words_____ at 15¢ each including name and address + _____ cost for picture = total payment enclosed _____

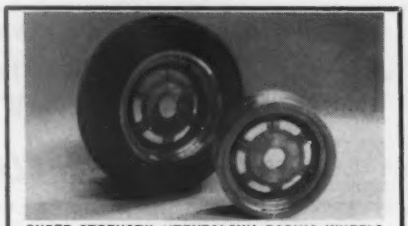
Name _____

Address _____

City _____ Zone _____ State _____

Signature _____

1
our first Birthday
TEC Auto
Parts and Accessories for Most British Automobiles
SPEEDWELL
Conversions for
B.M.C. Cars
FREE Mail Order Catalogue
TEC Auto
P. O. Box 96, Wellesley 81, Mass.


SUPER STRENGTH "TENZALOY" RACING WHEELS
"TENZALOY" 8" FINNED BRAKE DRUMS
"TENZALOY" ADAPTER—FORD 10SE TO PORSCHE-VW
"TENZALOY" REAR AXLE BEARING CARRIERS
105-E FINNED ALLOY VALVE COVERS
— OTHER ITEMS —
WRITE FOR DETAILS & PRICE LIST
VIGILANTE ENTERPRISES, INC.
1228 East Prince Road • Tucson, Arizona

NO BLIND SPOTS TO RISK ACCIDENTS

NEW PANORAM SPORT GLASS

The new wrap-around lenses permit unobstructed vision . . . protect eyes from wind too. W-i-d-e brown smoke lenses screen out glare from everywhere for motoring. Also available with plastic lenses for skiing.

(Only at Purdy's)
$15.00 POSTPAID

Creator of Eyewear Styles
PURDY
OPTICIAN
506 MADISON AVENUE, NEW YORK
between 52nd and 53rd Sts., Plaza 5-3690

ROAD TEST CORVAIR MONZA

Continued from page 73

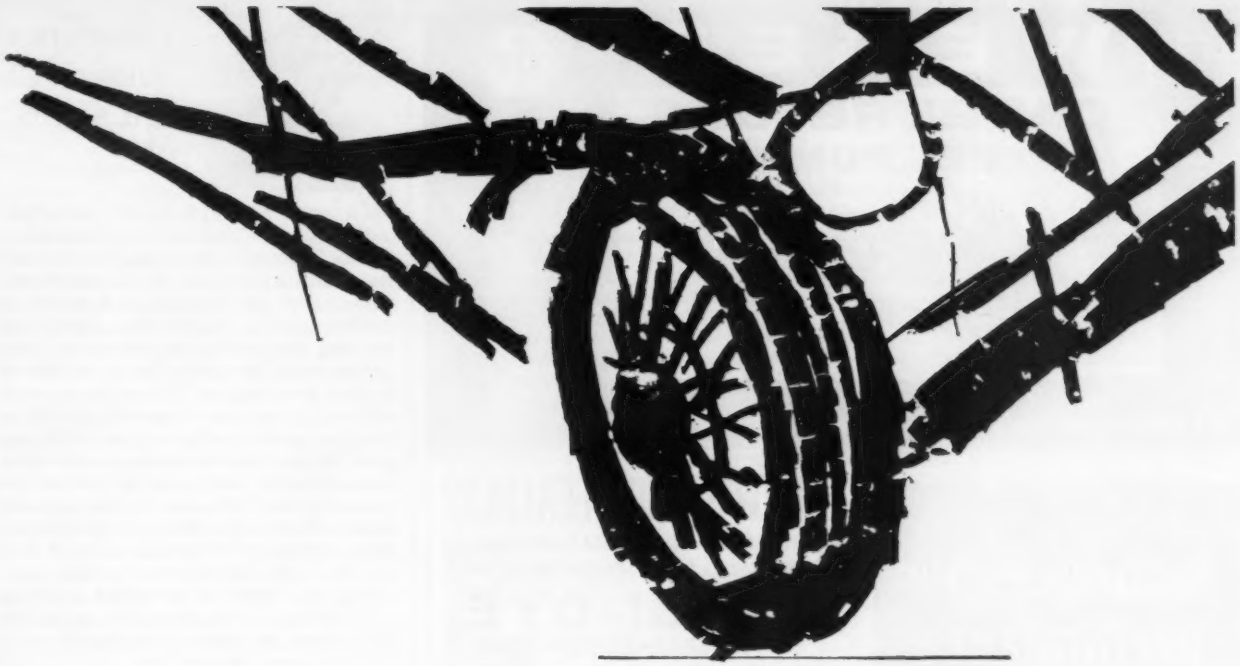
Monza. The exact process consists of playing the flame of a welding torch on the next to the last coil on the bottom of the spring while slowly drawing it down until it almost bears on the last coil. Too much flame will ruin the spring as will too much bending. Obviously the job requires experience rather than a massive array of exotic equipment. In the case of our test cars the job was done by Paul Sagan, Long Island's gift to the competition-minded. For this job Paul drew on a wealth of knowledge gained from preparing Porsches and Volkswagens for performance-seeking owners.

The cost of decambering can run anywhere from $20 to $30 depending on labor costs in your area and the number of similar jobs the shop has done before tackling your pride and joy. Another GM car that would respond to this treatment is the Tempest. Its rear suspension is a kissin' cousin to the Corvair's and should prove as simple to rework. One word of caution on both before you start carrying the torch: decambering should never be attempted on a brand-new car. Some 3000 miles or more are needed before springs and things bed down to their stock working heights. Also on the Tempest the rear end may be a bit shy on ground clearance (see SCI Road Research Report for March).

After doing all this work just what do you get in return in the way of improved handling? A rough analogy might be drawn between VW and Porsche handling. A stock Monza feels like a VW. A decambered Monza on the other hand feels like a '57 or '58 Porsche. If you haven't had the opportunity to try this assortment of automobiles for comparison we would say that these modified Monzas will not exhibit undue oversteer even when driven by a person who likes to use a car for something more than just transportation. A clod with more right foot than brains will still get himself and his Monza — modified or no — into sticky situations.

Both of our test cars were purchased and modified primarily for use in rallies. To this end they both were equipped with resettable Stevens odometers, and as a safety feature, healthy-sized fire extinguishers. For radio time signals both had German-made Blaupunkt radios which provided the test crews with undistorted music while under way. The modified Monza should prove to be just the mount for the map and cap boys.

For an up-and-coming executive who is not interested in rallying but needs dependable, fast road transport the modified Monza would seem to be tailor-made. It would also provide this mythical WALL STREET JOURNAL reader with a wonderful bit of reverse status symbolism like gold paper clips, or a jeweled toothpick. What could be more in tune with the times than a custom-built compact? —*C/D*



watch for the CAR and DRIVER AUTO SHOW ISSUE on sale April 4th

The International Auto Show is TOPS—in its variety of exhibits, the number of people it attracts, the excitement it generates! Whether you'll be attending the Show or not, you won't want to miss CAR AND DRIVER's special 144-page Auto Show Issue. It's a bonanza of information! There are exclusive photos, cutaway drawings and reports on the new models being introduced at the Show...road tests on many new machines...evaluations of new accessories and engineering techniques...the coverage in depth you expect from CAR AND DRIVER, formerly Sports Cars Illustrated. In fact...

it's filled with some of the most exciting features in automotive history!

- COMPLETE BUYER'S GUIDE to automobiles available in the U.S. at Showtime
- ROAD RESEARCH REPORT on Peugeot's all-new 404 sedan
- ENGINES—basics of the controversial Wankel engine, tech report by Roger Huntington on the V6, Grand Prix plans of Coventry Climax
- DREAM CARS—the inside story of a wild creation from one of the Big Three
- CUTAWAY DRAWINGS of the most sensational new production sports car of 1961, and of an all-new Grand Prix car design—for which YOU are invited to design the body!

•
•
•

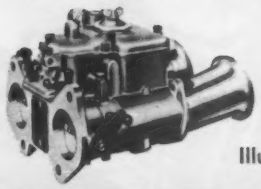
Be sure to get your copy of CAR AND DRIVER'S giant 144-page May issue—on sale April 4th—and

ONLY $1.00!

WEBER

GEON

CARBURETORS
FUEL PUMPS

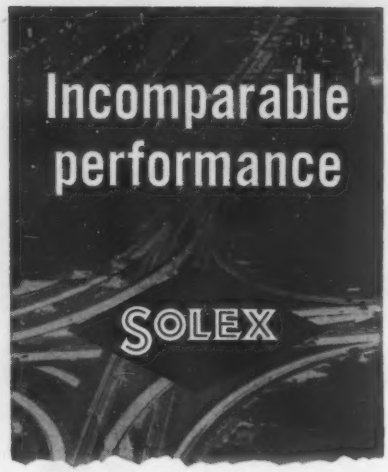


Write for Illustrated Catalog

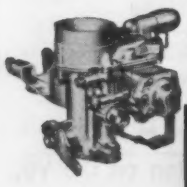
- ABARTH
- ALFA ROMEO
- ASTON MARTIN
- FIAT
- AUTO BIANCHI
- SIMCA
- O. S. C. A.
- MASERATI
- CITROEN
- FERRARI
- LANCIA
- STANGUELLINI
- PORSCHE
- RENAULT

EXCLUSIVE U.S. DISTRIBUTOR

GEON, Great Neck, N. Y., Phone: 516 HUnter 7-6600



Many American motorists have experienced the new high in efficient carburetion—offered only by Solex! This precision product is standard equipment on most quality imported automobiles. There is no substitute for Solex . . . the proof is in the performance!



Exclusive distributors in the United States

ARNOLT CORPORATION

WARSAW, INDIANA

HOW'S YOUR LEATHER?

Put fresh color and soft texture back into your leather seats with

MAGI-DYE
AUTO LEATHER REFINISHER
GENUINE FACTORY COLORS
FOR
MG • JAGUAR
AUSTIN-HEALEY
(Plus a complete color selection for most import cars)

So easy to apply . . . simply brush or spray on. Will not crack nor rub off. Gives leather that "new look." Satisfaction guaranteed.
Sold by outstanding import car dealers throughout the nation . . . additional dealerships available. If your local dealer cannot supply you, send check or money order.

Gentlemen: Enclosed is my check or money order for _____. Send me

_____	Pints Refinisher	@ $2.98
_____	Pints Cleaner	@ .95
_____	Quarts Refinisher	@ $4.98
_____	Quarts Cleaner	@ $1.50

Make of Car _____ Color of Interior _____

OVERSEAS MOTORS CORPORATION
2824 White Settlement Road, Ft. Worth, Texas

LE MANS, SEBRING, TARGA FLORIO, NURBURG RING, MONACO

Limited collection of FULL COLOR action packed posters of five famous INTERNATIONAL GRAND PRIX AUTO RACES. Vivid display of modern racing at its best. MUST for racing fans, sports car enthusiasts, hot-rodders, dragsters.

Average size 14 x 23 in.
One $ 2.00 any three $ 5.00 all five $ 7.00
Check or money order.

RACERS
26 O'Farrell St. Suite 306
San Francisco, Calif.

COMPETITION TUNING
A. C. BRISTOL

from page 71

REMOVING AND REPLACING THE HEAD

If it seems strange to mention such a prosaic procedure, think again. It is vitally important to follow the factory-recommended sequence for loosening and tightening the head. It's all in the shop manual and too long for publication here. Don't use a gasket sealer; the gasket has a varnish on it that does the job. You're in a touchy situation if you take a machine cut off the head to ensure a true surface. This can make the car illegal under production rules. Because of the loving care it receives, the head from the Pellandini engine has never been surfaced and it has many competition miles behind it. One partial solution is to lap the head carefully on a surface plate with a fine compound. Assuming a warped cylinder head, some local clubs or regions may allow the owner a slight cut as a "hardship case" but ask first.

ODDS, ENDS AND OPTIONS

There really isn't much left to do but race. The Pellandini car carries 9.5-to-one pistons; desirable, factory-optional and allowable as standard under SCCA rules. All of the other racing Bristols with which we are familiar are similarly equipped.

Oddly enough Stu has not touched the ports, one of the first areas most tuners hit. He took a look and decided that they didn't need it. We mentioned checking engine components for balance and it's a good idea. However, don't be too surprised if the factory balance is satisfactory. That's the way Bristol is.

The exhaust system is typically straight-through, ending just forward of the right rear tire. It would be difficult to improve upon the factory's beautiful headers so don't try. A factory Le Mans exhaust system is available that is supposed to do a highly efficient job of extracting the exhaust.

We haven't mentioned changing rod or piston clearances because it isn't necessary. Rods are fitted with about .002 inch clearance which is adequate. After a few break-in miles the pistons will quite likely have the .0045 to .0050 clearance that is considered ideal.

It would be presumptuous to recommend any particular oil but let us report on experience with Pellandini's machine. Using a highly-touted lubricant the car recorded maximum oil temperatures of 130 degrees C. With Standard Supreme 20-40 in the crankcase, oil temperatures dropped to 115 degrees C. maximum. This substantial drop with no other changes indicates that there is value in an owner doing some experimentation. Incidentally, an oil cooler has been added to the car but at this writing it had not been run in competition.

The only other option that the car carries is an extra S.U. fuel pump mounted on the trunk compartment bulkhead. It carries a separate fuel line which feeds into the system at the opposite end of the carburetors from the standard pump. Installed thus in parallel, it doubles capacity with no change in pressure.

Although other differential ratios are offered — 3.64, 3.91, 4.10 and 4.30 to one — the 3.91 rear is a happy compromise. It has been used with equal success on short, tight courses and on longer circuits such as Riverside with its mile-long back straight.

REMARKABLE RECORD

Planning a regular season's campaign with an A.C. Bristol means allowing time and money for maintenance. With careful preparation a driver who observes a 6000 rpm redline, and a little bit of luck, here is what to expect. After every third race look at the valves and touch them up if they need it. After every sixth event get ready to pull the bottom end and observe the rods. It is likely that a new set of Vandervell trimetal bearings will be indicated. The hardened crank seems indestructible. This particular engine has over 56,000 miles on it (it was a street machine before being "retired" to the race course) and the original crankshaft is in excellent condition.

At the beginning we called the Pellandini car "near unbeatable." That statement bears backing up. Without a fully detailed race chronology, here are a few of the performances that have shaken the competition. Bucknum's first ride was at the tricky Vaca Valley course. He managed to post fastest time of the day and a lap record for production cars against such formidable opposition as Porsche Carreras and Corvettes. He couldn't catch the Corvettes on the straights but he managed to narrow the gap substantially around the turns. During a recent Santa Barbara race, he spun while leading on the first lap. This error in judgment dropped him into 27th spot — dead last. It took him exactly seven laps to regain his lead, beating some first-rate competition.

Finally, at the Laguna Seca course near Monterey, California, Ronnie used the A.C. to ultimate advantage and stunned the crowd by beating out the Corvettes completely. Laguna it should be noted, is almost all fast bends and turns.

We think these performances demonstrate that the A.C. Bristol is an eminently satisfactory production race car. Drivers like it because it is not a constant battle to herd around a race course; owners like it because it collects that handsome hardware, and mechanics like it because it is reliable and rarely breaks up in action. The only nonenthusiasts are those with other *marques* who are regularly trounced by Ace Bristols.

—WT

IN NEXT MONTH'S C/D:

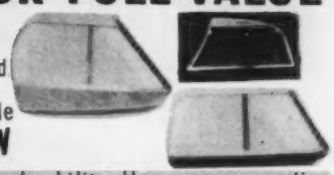
- **Cutaway drawing of an all-new production sports car!**
- **Special Section: Giant take-out on New York International Auto Show**
- **Porsche and Climax Grand Prix Plans**
- **Road Research Report: Peugeot 404**
- **Contest: Style a racing car!**

ON SALE APRIL FOURTH

BUY DIRECT FROM THE MANUFACTURER

BEST DUAL SLIDING WINDOWS● FOR FULL VALUE

MG-A or Austin-Healey 4-6 cyl. $70.95 ppd. Ins.
MG-TD, TF (specify bow-top) $80.95*'61 Design
Sprite $64.95 $2.75 ppd. Ins. Porsche $70.95 $2.75 ppd
Triumph TR's (specify mounting) $80.95 *
Jaguar XK-120, 140 All $89.95*Equip is Approx Double
All prices include 8% Excise Tax, Postage & Insurance.
shipped Freight Collect.* We guarantee safe arrival. NEW



Quality & Vital Features for proper fit, operation, durability. Heavy gauge acrylic glass slides smoothly on stainless steel springs. Heavy duty aluminum frame, no felt, canvas or celluloid to deteriorate. Controlled ventilation, no fogging; spring-loaded weatherstripping. Unitized rain gutter & bracket mounting. Polished to Chrome-like lustre. TD, TF, JAGUAR and TRIUMPH have leathergrained padded aluminum aprons. TR window frame locks into windshield, blow-outs prevented at high speeds. Brackets & hardware fit into existing sockets & mountings.

TAILORED CONVERTIBLE CANVAS TOPS – $29.95 – $39.95 Ppd. Best weather-proofing. MG TD,TF,WRAPAROUND TOP with REAR QUARTER WINDOWS–$50.00 Ppd.
BAKERS PLASTIC GLASS CLEANER. FINE SCRATCHES DISAPPEAR $2.00Ppd.
SNAP-BACK FENDER MIRRORS - Flat Face $4.95; Convex $5.95 Add $.50 PP.
ENGINE HEAT RESISTING ENAMEL: Grey-Red-Dark Blue-Aluminum $1.75 Ppd.
ENAMELED BADGES - 14 COLORFULDISTINCT SHIELDS $4.95 each. Ppd.
BRUSH-ON LEATHERCOATING - Red - Black - Green 1 pt. $3.95
SEAT BELTS..MEETS CAA & CORNELL LAB. SPEC. NON-SLIP BUCKLE INSTANT RELEASE FINGER TOUCH. $10.95 75¢ PP
DECK LUGGAGE RACKS: Detachable, no holes, 28 x 18" $27.95 35 x 18" $34.95 lustrous, no-rust aluminum

CARPETS–LUXURIOUS, HIGH PILE, UNDERLINED, RUBBER HEEL PAD. AH, Sprite, TR, MGA $29.95 TD $19.95 RED, BLA. Jaguar $38.95
RUBBER MATS, Easily Cut, Need no Binding, 36 x 74 $9.95 PPD. (Simulated pile) (Black)
CONVERTIBLE TOP DRESSING STAIN: Worn, dirty tops restored, water repellent. One Qt. $2.50 PPD.
GAS LOCKING CAPS: Triumph & MGA, Stainless Cap with adaptor. Fits exactly. Each $10.95 PPD.

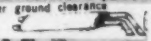
GRILLE GUARDS: Wraparound protection, full line.

PERMANENT TYPE AUSTIN HEALEY 4 & 6 cyl. JAG FLEX UNIT $9.95 ea.

Double gauge, flexible stainless steel. 2 clamps

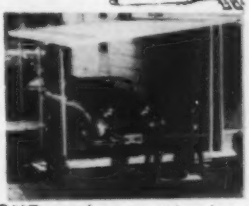
MUFFLERS: Free-Flow,glass packed, deep throaty sound.*
A.H. Kit, Exhaust before rear wheel; 6 cyl. & Sprite $29.95 Muffler alone $19.75
A.H. Kit, 4 cyl, Single outlet with pipe and clamps $20.95 Muffler alone $13.95
Triumph, speed kit. Main Muffler & pipe $19.95. Dual outlet system 2 mufflers $29.95
MGA single $13.95; Dauphine dual $15.50;

AUSTIN HEALEY greater ground clearance



PATIO & CARPORT ATTACHED

92" x 432" for SPORTS & COMPACTS * * $89.95
Pictured with 3 straight legs. White only.
Roof Wgt. 135 lbs. Legs 29 lbs. Total 179 lbs.
102" x 576" Supports 2 Prs. TV Legs $129.95
Roof Wgt. 180 lbs. Legs 30 lbs. Total 210 lbs.
122" x 720" Supports 2 Prs. TV Legs $179.95
Roof Wgt. 250 lbs. Legs 30 lbs. Total 280 lbs.
Add $22.95 for Self-Standing Extra TV Legs



All parts and hardware are packed together in this ONE package. Absolutely nothing extra to buy. Every part is cut and pre-punched accurately for assembly.

CV: Steel Frame, Bolts together-BZ Wood Frame,-Pre-Fab section CV, with aluminum siding ● UTILITY BUILDING ● PRICES ON REQUEST.
Best Grade Aluminum. Modern overhead doors. Not Shown: One Car Type "BZ" One Car Type "CV" as shown. V-crimp Siding Simulated Wood
Type "BZ" (Sectional Doors)overhead 1-9'x6'-6"x1-3/8" four section wood

WIDTH-LGTH-HGT.	Price	Shipping Wgt.
10'x18'x6'-10"	$399.50	970 lbs.
12'x20'x6'-10"	477.50	1100 lbs.

Wood Frame	WIDTH-LGTH-HT.	Price
Aluminum	12'x20'x7'-6"	$612.50

Galvanized simulated wood shingle - $90.00 less
STANDARD EQUIP INC: Type "CV" - 1-8 x 6 x 8" one piece wood overhead door.
OPTIONAL Type "CV" or "BZ" Wood Sash (Window) 2'-0"x2'-9" glazed $26.50

UB UTILITY SHED, AND BZ SIDING AS ILLUSTRATED UTILITY SHED.
Type UB 46 4-0"w x 6'-6"h Wood Frame & Door. Alum. Sid. & Roof $145.50
Type UB 68 6'-0"w x 8'-0"l x 6'-6"h Wood Frame & Door. Alum. Sid. & Roof $185.50
Note: Galvanized Steel UB 46 Type – $23.00 less UB68 Type – $35.00 less (Siding

TERMS OF SALE: 25% Deposit, balance shipped COD Frght. Collect.

→ SEE US BOOTH 216 – N.Y. COLISEUM APRIL 1 TO 9 ←

BAKERS WORLDWIDE
Factory Showroom & Installation Dept. Open 6 Days Floral Park 4-4445
at 1069 Hempstead Tpke., Franklin Square, L. I., N. Y.
BOX 57, DEPT. CD-4, FRANKLIN SQUARE, N.Y.
Prices subject to change without notice Sorry, no COD's

RAMCOTE
FLEXIBLE
UPHOLSTERY FINISHES

Restore nu-life and color to faded, soiled car, plane or boat upholstery! Seats, headliners, sidepanels, convertible tops, cloth rugs and rubber floor mats will have that original look again. Easily applied brush or spray. Won't chip or peel. Fadeproof. You can change color too! THE ONLY PRODUCT OF ITS KIND AWARDED THE MOTOR TREND SEAL OF APPROVAL. Write for free information, color chart and dealer location.

RAMCOTE PRODUCTS 3141 WEST 69TH ST CHICAGO 29 ILLINOIS Dept. CD-4

SPEED - MG - POWER

Fit an H.R.G.—DERRINGTON 4 port light alloy cylinder head for the maximum increase of power to your M.G.A. and get equal performance to the Twin-cam M.G.A. Fits all 'B' series B.M.C. engines, Magnette, Riley, 1.5, Wolseley, Metropolitan, Oxford, new A.55.
Complete head Kit $180
Plus valve spring assembly $210
Packing and post free.
POWER EQUIPMENT for
TRIUMPH TR, HERALD, all BRIT. FORD models
A/H SPRITE, A/H 100/4, 100/6 & 3000
all British & most Continental makes.
LIGHT ALLOY CYLINDER HEADS, FLYWHEELS
OIL RADIATORS, ENGINE PLATES, PUSH RODS, ROCKER COVERS
WEBER TWIN CHOKE CARBURETTERS
8 inlet pipe assemblies.
EXTRACTOR EXHAUST MANIFOLDS (headers)
SPECIAL RACING CAMSHAFTS.

V. W. DERRINGTON LTD.
London Rd., Kingston-on-Thames England
The Originator of Sports and Speed Equipment 1920. Suppliers to all the leading Racing Car Manufacturers.

MORGAN
BORGWARD
PARTS
Delivered to you within 24 hours!
FERGUS
IMPORTED CARS INC.
444 West 55th St.
New York 19 JU 2-1466

MOVING?
Be sure CAR AND DRIVER follows you. Please send your change of address to
CAR AND DRIVER
CIRCULATION DEPARTMENT
434 So. Wabash Avenue
Chicago 5, Illinois

ROAD TEST CITROEN STATION WAGON

from page 57

(from the driver's viewpoint) is more "pressure-sensitive" than "distance-oriented". The full extent of the brake pedal's movement is only ¼-inch (compared to the clutch's 6½) yet the feel is such that you immediately become accustomed to this entirely new mode of operation. Previous Citroëns we've driven had the brake "button" located on the flat part of the floor, quite near the driver's seat. But on the test car, we found it in the more usual spot to the left of the accelerator.

We're generally against unnecessary complications of automotive structure, but since disc brakes on large cars require power assistance anyway, it seems to us that the Citroën technique represents a worth-while improvement rather than a novelty which is different for the sake of being different. Here's why:

The deceleration of the driver's body is a natural servo device which serves to augment the driver's own efforts in making a panic stop. A frequent complaint for power-braked cars is that the driver must brace himself against, say, the steering wheel to counter the decelerative forces rather than against the brake pedal itself as with unassisted braking. In the Citroën this drawback is obviated because a good part of the driver's foot is not on the pedal and it is quite simple, if not natural, for him to use his heel to brace himself (perhaps in addition to leaning on the steering wheel), doing the braking itself with only the ball of his foot.

A further though minor advantage is that anyone strange to the car will immediately realize it has power brakes from its unusual pedal arrangement, rather than through the rude awakening of an unintended panic stop.

Well to the left of all the pedals, up against the cowl side structure, is a lever that could well be christened the Ground Clearance Adjuster. All the big Citroëns have Air-Oil self-leveling suspension which, no matter how much you load the car down, will in a matter of moments lift the car back to its previous height. In other words, the static ground clearance is constant, no matter what the load. (This could also be achieved by not having any suspension at all!) The lever has five detents in its quadrant. The normal position is the one next to the bottom. This gives you 6 inches clearance under the exhaust pipe (which runs down the centerline of the car, using up 1½ inches of the 7½-inch clearance the rest of the car enjoys).

Lifting the lever to the next notch adds ⅞-inch to the clearance; lifting once more adds another 1⅝ for a total clearance of 8½ inches at the tail pipe or 10 inches to the floor. If you're in really rugged country, though, just flip the lever all the way to the last detent. This raises the Citroën a final 1¼ inches, putting it right up on its tiptoes like a cat stretching itself.

The other extreme position of the lever gives minimum clearance (a mere 2⅜ inches at the tail pipe) as the station wagon settles down like a mother hen on her brood of chicks. Although you're more likely to use this position to puzzle your neighbors it has a very significant purpose, namely for changing a flat tire. First you run the car up to its full height. Then you place the bipod strut over the knob on the frame rail under the door. Using its pin and hole adjustment, stretch it out to its full length. Now drop the car on its suspension with the Ground Clearance Lever. It not only settles down like a lop-sided mother hen, it lifts its lame wheel up in the air! Now all you do is remove the hubcap and undo the single, large central hex nut, drop that wheel off, pop your spare in place and, as soon as you run the suspension up to remove the bipod, you're ready to drive away, lowering the suspension to normal clearance as you go. It practically makes changing tires a pleasure.

Of course, when you drive with the suspension in either extreme position, the comfort factor drops to nil as the wheels are firmly held by all the hydraulic pressure available.

With the lever in its normal position, there are two situations where the big Citroëns are extraordinary in their ride comfort. On cobblestone pavement or unpaved roads of equivalent roughness, the Citroën at speed just whispers over the bumps. The other astonishment is the absence of pitching when traversing great long dips, the kind that are much longer than the wheelbase.

We have a favorite strip of road that tests this usual weakness to a high degree; the Citroën is the only car that passes this test, and the faster you drive, the better it rides through them.

Our only complaint on the ride involves the necessary time lag built into the self-leveling system. When you accelerate away from a light at wide-open throttle, the self-leveling lifts the nose just before you shift to second, and thereafter the whole car seems to lift itself up high. When you crest a hill, or start up one or brake to a stop from sixty or so, first the nose moves in the expected direction and then, after the usual pause, it moves back again. The annoyance stems from this: the return motions seems to occur only a fraction before you've finished braking or gotten used to the fact you're climbing or descending a hill. You then have to get used to a second attitude, one which was established outside your direct control.

Some of the aspects of this self-leveling are downright comical. For instance, you get out of the car at a gas station and stand by the attendant while he fills the tank (the cap needs a bigger vent, incidentally, otherwise you lean out on top speed runs). After he's put in some 12 or 13 gallons, the rear of the car will silently raise itself to its previous level. But don't watch the car. Watch the attendant's face.

But the brightest trick of Citroën-motoring must be credited to a New York doctor. We don't know who he is, but whenever he parks at the curb, he raises his Citroën as high as it'll go on the

(*Continued on page 92*)

CAR and DRIVER wants you to be one of the first to read

The Raw Truth about the Men and Machines that Race with Time–and Death!

HERE'S a book that re-creates the thrill and suspense—the very sights, sounds, and smells of memorable automobile races in America and abroad. You'll ride with the "demi-gods in goggles" who **drive** the cars—look over the shoulders of the engineers who **build** them—sweat it out in the pit with the mechanics who keep them rolling.

OF MEN AND CARS makes you an "insider". It gives intimate profiles of champions—tells of their driving technique and racing strategy—ambitions and life philosophy—even their thoughts on making love. **You feel as though you had personally met—talked to—learned from these men. You cannot help picking up pointers and ideas that will make YOU a better driver!**

Each exciting narrative, selected by famous driver-author John Christy, is dramatically illustrated with action-filled photographs. Here are stories of the greatest men and moments of the sport which you'll read over and over again—and never forget!

First Edition copies of this exciting book are being set aside for readers of CAR AND DRIVER. Get yours NOW for a FREE 7-DAY EXAMINATION. If you decide you don't want the book, simply return it. You owe nothing, pay nothing. Otherwise, you need remit only $3.95 plus shipping. Mail Coupon below today!

YOU TALK SHOP at Daytona • Bonneville Indianapolis • Le Mans • Monte Carlo • Mille Miglia . . . **wherever** the big races are run!

YOU SHARE THE COCKPIT with Frank Lockhart • Goldie Gardner • George Eyston • Marquis de Portago • Fred Dixon . . . dozens more!

YOU ARE THERE with Donald Healey • Colin Chapman • Enzo Ferrari • Alfred Neubauer . . . other great designers and managers!

A REVEALING BOOK...ONE THAT MAKES YOU AN AUTHORITY wherever sports car and racing enthusiasts—or anyone with a taste for the vital, dynamic things in life—get together. OF MEN AND CARS discusses controversial topics, such as the series of Ferrari crashes—the Le Mans disaster—the inexplicable slip-ups of the Marquis de Portago. It gives facts about engineering advances...the economics of racing...anecdotes and human highlights.

The Marquis de Portago with world champion Juan Manuel Fangio at the French Grand Prix.

Alfred Neubauer, Stirling Moss (right) and Denis Jenkinson after their 1955 Mille Miglia victory.

The Cooper team, left to right: Jack Brabham, Bruce McLaren, John Cooper.

You wait with the chief-driver in the pit "sweating out" every hour of the race!

Moss (11) and Brabham (8) taking a corner at the Dutch G. P. Zandvoort

FREE 7-DAY EXAMINATION

Car and Driver • Book Service
One Park Avenue
New York 16, N. Y.

Please send me **Of Men And Cars** for a FREE 7-DAY EXAMINATION. If I like the book, I will send you $3.95 plus small charge for postage and packing. If not completely satisfied, I will return book within 7 days and owe you nothing.

5008 EF 1512

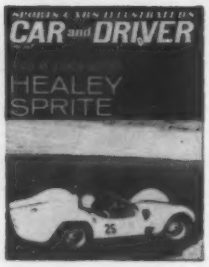
NAME _____
(Print)

ADDRESS _____

CITY _____ ZONE ____ STATE _____

☐ **SAVE MONEY.** Enclose $3.95 now as payment in full and we'll pay shipping charges. Same return privilege and prompt refund guaranteed if not 100% satisfied.

SEND CAR and DRIVER EVERY MONTH



name

address

city zone state

Check one: ☐ 3 years for $12
☐ 2 years for $ 9
☐ 1 year for $ 5

Foreign rates: Pan American Union countries, add 50¢ per year; all other foreign countries, add $1.00 per year.

In the U. S., its possessions and Canada

MAIL TO: CAR AND DRIVER CD-461
434 S. Wabash Ave., Chicago 5, Ill.

FREE! Engine Torque Specification BOOK

The proper use of a good torque wrench will help keep your car at peak performance

Torque control when servicing highly tuned racing mills or the fine engine in your sports car can actually improve performance. It can be the one thing you do that will keep your engine running when others fail.

Write for your free specification book S (1200 Models) handy fact chart and price list.

P.A. STURTEVANT CO.
ADDISON QUALITY ILLINOIS

MOON Equipped WE'VE GOT IT ALL

YOU NAME IT, IT'S IN THE 1961 MOON CATALOG

Send $1.00 (refundable with order) TODAY!

MOON EQUIPMENT CO. 10820 S. Norwalk Blvd. Santa Fe Springs 20, Calif.

(Continued from page 90)

pneumatic suspension. As a result, his bumpers are left at an aggressively useful height, fully able to cope with whomsoever blunders into them. This trick should be in the owner's manual and part of every Citroën salesman's technique.

With only two liters to cope with its ton and a half, the performance is understandably unexciting. The one feature of note was that the car will go just as fast in third as it will in top, namely 80 miles an hour. This is 5000 rpm and 3450 rpm respectively, which shows how vastly overgeared the Citroën is in top gear.

In fact, fourth is best thought of as an overdrive (it is an indirect gear), to be used only for cruising down the road and not for serious acceleration.

The station wagon enjoys some of the features of both the ID and the deluxe DS sedans. It has the power brakes of the DS but, like the ID, has neither the automatic clutch nor power steering. The latter might be a useful option as the manual steering is indeed heavy at low speeds on tight corners or for parking. Going down the road at pleasant country speeds though, the steering has a good, vintage-like firmness which well matches the tradition of front-wheel drive. For a full discussion of the latter, see the Panhard road test in SCI, June, 1960. Front-wheel drive has its devotees, though we're not among them (we're neither for 'em or agin 'em, just neutral), but we were impressed with our test car's cross-country agility when a near-emergency impelled us to return to New York from Lime Rock as quickly as possible. We broke all our personal records (including Ferrari-mounted ones) and left the road only once. That was vertically so it doesn't count.

The wagon understeers at all times, except when you close the throttle abruptly in the midst of a fast bend. The steering seems to get quicker as you go faster. This arrangement is quite rational. It keeps parking manageable, yet gives you quick steering for safe control during fast driving.

There are four different seats in the wagon. The first two take three in normal, forward-facing position. The other two are single-seaters mounted transversely in the rear, which are fine for kids and at least adequate, if somewhat unstable, for adults. They and the large middle seat fold flush to give an extra long cargo deck. We had only two minor complaints to make about this arrangement. One is that the two jump seats should have rubber stripping on the flanges so that they won't rattle when folded into the metal floor. The other is that to fold the rear seat you must open both rear doors (to get the armrests clear) and the front seat mustn't be in its rearmost position. Such arrangements are invariably compromises, so deserving of mention is the erect, chair-height seating position of the rear seat (when it's not folded).

While the complicated contouring of the tail gate looks distinctively odd, it folds down to make an exactly level, load-carrying extension of the floor. The upper gate, which includes a vast window, can be raised to two positions, open and wide-open. Though it's heavy, it is cleverly shaped so that you just cannot mash your fingers when you close it.

The tail gate has a complicated-looking, dual installation for license plates. It's intended for those European nations where you buy your own plates. The idea is you get three instead of two, mounting a pair of them at right angles on the tail gate so that you are legally registered and adorned whether the gate is up or down. In America, alas, a pivoting bracket is better suited to our needs. Besides, neither of the two positions is large enough for our 6 x 12-inch standardized plates; they have to be bent into position.

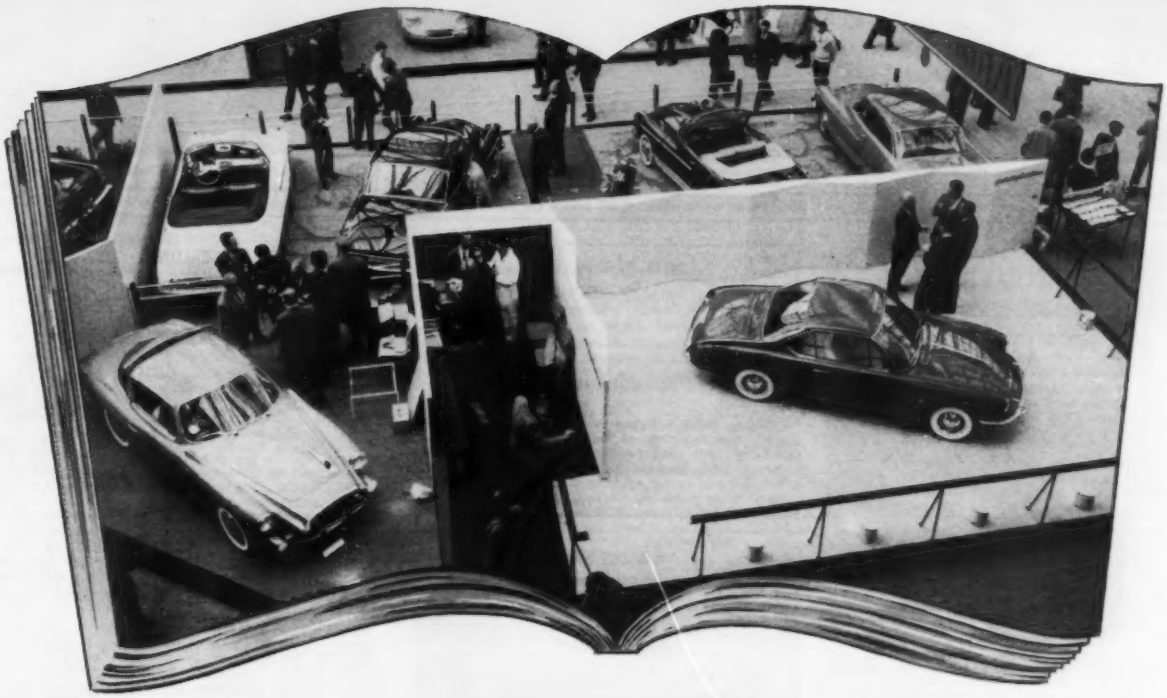
As station wagons go, the Citroën is considerably taller inside than most, though narrower. Since its tail gate in its wide-open position is so high, the Citroën is especially attractive to anyone who would want to carry loads that are both tall and wide. Like an upright piano, maybe.

Parents of small children will be interested in the clever inside door locks. The handle is fixed and a pair of thumb latches open or prevent the opening of the door. We won't try to describe their technique of operation; suffice to say that by the time a child can master them, he is undoubtedly old enough to know better than to open the door while the car is moving. And if your children are smarter than the ones we know, you can still put them in the mobile playground with the jump seats.

As we said, Citroën builds cars that are different. Anyone who buys one will find it has many endearing features, more than we have room to tell about. If you like life to be interesting yet need a practical sedan or station wagon, you should look into the Citroën. It will surely surprise you and it may well satisfy you.

No matter what you read about them, the best way to explore a Citroën is to drive one. *C/D*

". . . and if you get tired of a big car, just tear along these perforations . . ."



HOLD YOUR OWN AUTO SHOW WITH THE 1961 SPORTS CARS ILLUSTRATED DIRECTORY!

Ramble through the pages of the most exciting auto show in print! You can see all the fine cars of the world on display—complete with prices, specifications, and performance features. You can compare Detroit's compacts with new imports...pass judgment on the most popular sports cars. Best of all, there are no crowds, no fuss, no bother—the whole panorama of the fascinating world of the automobile is right there in your hands!

Check these features of the
1961 SPORTS CARS ILLUSTRATED DIRECTORY:

COMPREHENSIVE BUYER'S GUIDE to sports, economy, and touring cars—grouped by cost and purpose so that you can compare them almost at a glance!

COMPLETE ROAD RESEARCH REPORTS on the Triumph, Valiant, Austin 850, Chevrolet Corvair and Corvette, Daimler SP250, Renault Caravelle, Porsche 1600 and Super 90, Ferrari 250/GT, Sunbeam Alpine!

SPECIAL TIRE GUIDE tells you where to find tires for every kind of imported car...exactly what's available on the market!

EXTRA feature on SOUPING THE SMALL SEDANS: how to hop up a Fiat, an Austin, a Volkswagen, a Renault!

Don't miss out on *your* copy of the 1961 edition of the SPORTS CARS ILLUSTRATED DIRECTORY—on sale on March 7th. Reserve your copy now at your favorite newsstand or fill out this coupon and we'll send you one on publication date. Only $1.00.

Ziff-Davis Publishing Company 5010
One Park Avenue, New York 16, N.Y.

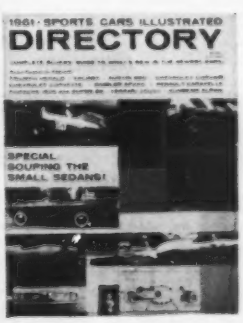
Please send me a copy of the new 1961 SPORTS CARS ILLUSTRATED DIRECTORY. I enclose $1.00, the cost of the DIRECTORY, plus 10¢ to cover mailing and handling charges. (Canada and Foreign, $1.25 plus 10¢ postage.)

Name_____

Address_____

City_____ Zone____ State_____

EF2010



Commercial Rate: 40¢ per word. Minimum 10 words. June issue closes March 20th. Send orders and remittance to: Martin Lincoln, CAR and DRIVER, One Park Ave., N.Y.C. 16.

FOR SALE

A.C.

1959 Aceca Bristol, 12,500 miles, Excellent condition. Color BRG with tan leather interior. $3795.00. Consider trade. Tom Paxton, 705 Hillmoor Lane, Birmingham 9, Alabama.

A.C. Bristol Ace Stage II. 1961 model. Never registered. Never raced. Nearly new. $4,650.00. H. Crossett, 4609 So. Lindhurst, Dallas, Texas. EM 32360

ALFA ROMEO

1960 Alfa Romeo Spider Rdst. Wrecked but repairable. Never raced. Low mileage. Excellent special potential. Send 25¢ coin or stamps for picture and price. Body damage only. Brumbaugh Co., Inc., 301 Union Ave., Altooma, Penna.

1959 Alfa Romeo Sprint Veloce (fast coupe). Like new. $2775. Wes Day, 2815 Beverly Drive, Des Moines, Iowa.

ALFA ROMEO. 1960 Conrero. Concourse condition. $4000.00. B. Plouffe, 59 Rugby St., Cranston, R. I.

ALLARD

1954 CAD ALLARD. Have bills showing $2,000 spent in past 60 days for rebuilding engine completely. New carburetor, new paint, new top, reupholstered, floor covering, trunk lined, 4 new Michelins. Mint Condition. $3,495.00. A. C. Kyle Jr., Box 1212, Syracuse, N. Y. Phone Gibson 6-1515.

ASTON MARTIN

ASTON MARTIN, 1958, coupe Concourse winner—write E. Marburg, Box 575, Newfane, N. Y.

AUSTIN HEALEY

1955 Austin Healey 100-S. Newly rebuilt modified engine. Factory aluminum body, Spot brakes, Detachable Roll Bar. A real lively machine for road or race. $3,500.00. A. J. Sutton, Attica, Ohio. Phone 426-4475.

BERKELEY

COMPETITION Berkeley 500 c.c. (1959). Re-bored; Special Racing Pistons, New Clutch, Three Carburetors, etc., Rubber Perfect; Embarrassment to Cars 5X the price ($895.00). Call or write: S. A. Gilliland, 111 Aran Hill Road, Fairfields, Connecticut. CL 9-7136.

BORGWARD

1959 Borgward Sedan, radio, heater, good condition. $1300. Will trade. Donald Wood, Station C, Worcester 7, Mass. PL-6-6652.

BUGATTI

TYPE 55 Bugatti—Chassis No. 55225—Engine No. 55225/28. Very pretty two seater body by Bugatti. Rebuilt mechanically to original specification entirely. New cylinder block fitted, crankshaft re-rollered, whole car perfect throughout. Any inquiries should be made to Miss A. Turner, "Lynton" Fore Street, Weston, Nr. Hitchin, Hertfordshire, England.

CONNAUGHT

CONNAUGHT Type C Formula 1 Grand Prix race car. Complete equipe with spare engine. Can be seen N. Y. $3000 imported. Enquires to Emery, Connaught Cars, Portsmouth Road, Send, Surrey, England.

FERRARI

FERRARIS, Priced to Sell: 3.5 and 4.5 in excellent condition, some spares. Super-Monza with 4.9 Corvette engine, Ferrari rear-mounted transmission, deDion rear-end. Write or call for prices, car histories, Dean Knight, Box 5426, RX TE 8-3304, Tulsa.

FERRARIS—New and Used. RRR Motors, Inc., 18009 S. Harwood, Homewood, Ill. Sycamore 8-9070.

NEW READER RATE

15c per word, including name and address. Minimum insertion: 10 words. Pictures—$15.00 including engraving. Furnish glossy photo.

FORMULA JUNIOR

FORMULA Junior. If you wish to buy your formula junior, new or used, at prices to suit you, give us details of your requirements and we can offer you a choice of fast, trouble free machinery. We also supply a full range of racing equipment as used by the top line drivers. Write today to: -Rallye Cars (Racing Division), Seagate, Dundee, Scotland. Phone 25050.

FRAZER-NASH

FRAZER-NASH "Mille Miglia" 2-seater. Actual London Show car, class winner LeMans. Alloy body, Bristol BS4 engine, c/r box, Borrani wheels with R5's, 0-6 6.7 secs. Only 2,000 touring miles since rebuild costing £ 2000, now in Concours condition, $5000. Hans Edwards, Stevenage, Herts., England.

JAGUAR

JAGUAR, 1959 XK150S roadster, white. Has everything, including Fiberglass top. Traction masters, and radio. 18,000 miles. L. Champoir, 3220 Lynch S.W., Massillon, Ohio. TE 3-2123.

JAGUAR XK120 coupe, needs tune-up. Best offer. Richmond, Smithtown, N. Y.

MERCEDES BENZ

1955 Mercedes Benz 300SL coupe. Real clean. 26,000 miles. Might Trade. $4850.00. Dean Bangert, 22 Wood Land Trails, Polos Park, Illinois, Gibson 8-7575.

1955 Mercedes-Benz 300 sedan. Beautiful condition. Brand new factory warranted engine. $3,500. Jack Wherry, The Decker House Inn, Maquoketa, Iowa.

MG

MG TD 1954. Garaged five years. $2,000. Lukas, 155 Thames Street, Port Jefferson, New York.

M.G.-T.C., 1949, 16 inch wire wheels, louvred hood, excellent condition, details on request. Marah, 1624 The Alameda, Apt. 12, San Jose, Calif.

1951 M.G.-T.D. Cherry red new paint, engine completely rebuilt, good rubber, $895. Terry Matheny, 1805 First St., N. Newton, Iowa.

PORSCHE

PORSCHE RS Late 1600. Ex Ken Miles Car. Unusually fast. $5500. Best Offer. Steve Herrick, 4027 Ursula, Los Angeles 8, Calif. AX 4-9366.

PORSCHE 550-1500 Spyder $2995.00. Bill Bowman, 4202 Burnham (GR 9-6460) Toledo, Ohio.

PORSCHE RS60 Spyder 1600 cc New Paint, engine and transmission. Completely overhauled by Canadian factory. Will Deliver. To Inquire, Write: Peter Ryan, Mont Tremblant, P.Q., Canada.

FOR Sale: Porsche, RS-60 Spyder, 1960. Silver, excellent condition. 1500 cc with 1600 cc cylinders and pistons. 9 wheels, extra transmission gears, triangulated roll bar, 3" safety belt. Engine, clutch, transmission just overhauled by Porsche factory man. Many extra spare parts, and special tools. Will consider trades, American or foreign. Don Horn, P. O. Box 3736, Memphis, Tennessee. EXpress 7-7549 or MUtual 2-1898.

SCALONE

SCALONE. 750 cc. Mercury outboard power. All independent. Car is brand new minus 2 races. Has right combination for development into class H champion. Trailor included. $1850. Antonio R. Scalone, 328 Front Street, Vestal, New York.

SINGER

1953 Singer Roadster. New interior, tires, paint. Excellent condition. 32,000 miles. Best offer over $550. Ben Barlow, 150 E. Maiden Street, Washington, Penn.

MISCELLANEOUS

CAUTION: Do Not Lower Windows At Speeds In Excess of 120 M.P.H. This official appearing engraved metal plaque for your dashboard and doors. Applied and removed in seconds without damage to surface. $1.00 each. Postpaid airmail. Sports Car Bazaar (SC), 6019 44th N. E., Seattle 15, Washington.

SOMETHING For Sale? Place a classified ad in this section. Low-cost, fast results. It's easy.

THE most powerful Class H car in the World. Win all Class H Drag, Road and Track events. Ex. Donald Campbell. Twin O.H.C.S/CM.G. 180 + B.H.P., I.F.S., I.R.S., R and P Steering—Prepared to attack International Records. Every part from nitrided crankshaft to steering wheel brand new and unused—all bills available. Stripped for buyer's agent to inspect. Numerous spares includes 3 engines and all drawings $4500 F.O.B. Full particulars to Milton, 25 Dorchester Road, Fixby, Huddersfield, Yorkshire, England.

HARDTOPS—removable fiberglass hardtops to fit Triumph T.R.3 & M.G.A. Easily installed, these tops are finely upholstered, finished in factory colors or prime paint, reasonably priced, fully guaranteed. Send for free brochure. T. M. Parrish, 1723 Borland Rd. Pittsburgh 16, Pa.

JUDSON supercharger, '59-'60 Renault Dauphine. Excellent. Complete $90. Joseph Paul, 4227 W. Highland, Milwaukee, Wisc.

HUDSON Supercharger and VDO electric tach for Volkswagen both unused and in original cartons with instruction, sacrifice complete kit $150.00. Roger O'Neill, 49 Afterglow Avenue, Montclair, New Jersey.

TEARING down special. All Crosley and Braje equipment for sale. Also slightly injured Devin body. Dr. A. F. Staeger, Ash Grove, Missouri.

METRIC End wrench set, 5 piece, 6x7, 8x9, 10x11, 12x14, 17x19, mm Nickel plated $2.89. Metric Box wrench set 5 piece, same sizes, 15 offset, chrome plated $4.39. Both sets $5.75 Postpaid. Free Brochure. Louis B. Pierlot P.O. Box 346, Inglewood 5, California.

ATTENTION—Used foreign car parts. Dismantling quality body and mechanical parts from our large inventory of sports and foreign cars. Foreign Car Parts Mart, 3304 Payne Avenue, Cleveland 14, Ohio. WA 1-4531.

JUDSON Supercharger for Volkswagen, complete kit including spare carburetor, jets pressure gauge $75.00. Jim Brick, 633 Trovethan, Santa Cruz, Calif.

SEAT Belts, Competition Type, Quick Release Buckle, 100% Nylon, Khaki, 2". While they last—$4.95 postpaid. Cole Grand Prix. 4051 Broadway, Oakland, California.

THE Truth about Speed-Power-Mileage Equipment. Free Catalog. Write! Almquist Engineering. Milford SC-2, Pennsylvania.

SOMETHING for sale? Place a classified ad in this section. Low-cost, fast results. It's easy. For information, write: Martin Lincoln, One Park Ave., New York 16, New York.

IMPROVE That Import!!! Now—Perfect carburation for all Solex Carburetor equipped cars with the Micro-Meter-Power-Jets. Regardless if you own a VW or a $13,000.00 Mercedes Benz or any other of the 57 Solex Carburated marques, greatly improved performance and economy can be yours with these precision jets. Find out what that little gem of yours can really do when tuned to perfection for the altitude you drive in, the climate you live in. Sold on money-back guaranty by people with 28 years in the business of fuelling internal combustion engines. Request information or send $3.50 to: Fish Canadian Carburetors, P.O. Box 26, Willowdale, Ontario. U.S. orders shipped from P.O. Box 51, Kenmore, 17, N.Y.

RECONDITIONED S.U. Carburetors. Im-med. exchange on popular sizes. $38.50 pr, Extra charge for damaged castings. Foreign Carburetor Service, Box 1481, Monterey, Calif.

DYNAMOMETER—new RPM 6500, Hydraulic water brake, accurate, $950. Ferret Eng.—2730 Hylane Dr., Birmingham, Michigan.

SUPERCHARGE your Corvette, T-Bird or Mercedes 300 SL. Bolt on the Latham Axial Flow for ultimate performance with economy. For most American OHV engines. Send $1.00 for complete supercharger story and reduced prices. Latham Mfg. Co., P.O. Box 165-E, West Palm Beach 15, Fla.

STEWART-WARNER Ammeters. Brand new surplus, 20-0-20 amps. 2½" face, mounting bracket, illumination provision. $1.99 plus 15¢ postage. Martin Goffe, Box 74 AD, Brooklyn 19, New York.

FOREIGN Car Auto Wrecking. Used and rebuilt parts available for over 600 cars. Sports Car Engines, transmissions, rear-ends, and complete chassis' our specialty. New and used Accessories. Complete stock of generators, starters, distributors, fenders, doors, grills, glass, wheels and tires. All parts guaranteed. All inquiries promptly answered. Dealer discount given. All prices F.O.B. Los Angeles. Grand Prix Auto Parts, 12613 Sherman Way, No. Hollywood, Calif. TR 7-5479 PO 50360.

JAGUAR owners, Healey owners: Stainless Steel Flexible Exhaust Tubing Permanent replacement between exhaust pipe and muffler. Complete with heavy-duty clamps. Healey $5.50, Jaguar $5.95 (modified requires two) postpaid. Quantity inquiries invited from dealers. Wilco, P. O. Box 1128-S, Rochester 3, N. Y.

ALL Foreign speedometers, clocks, tachometers, temperature gauges repaired and recalibrated. Minimum $5.00, Maximum $8.50, guaranteed. Cables. Send to Mack Instrument Service, 13001 Mack Avenue, Detroit 15, Michigan.

MONA-Tone Gutted mufflers for car owners, hot-rod fans. More power! More mileage! Rich, mellow tone! Fits all cars. $5.95 plus COD and postage. Give year, make, model. Universal, Box 7823S, Nashville 9, Tennessee.

STAHWILLE Metric & Whitworth tools. Complete line including special tools for VW, Porsche, Mercedes Benz. Metric & Whitworth taps & dies, thread restorer files, thread pitch gauges. Copper brazed oil coolers for VW and Porsche. Free catalog. Money making opportunity for auto dealers, auto importer, established wagonmen. Louis B. Pierlot, P.O. Box 346. Inglewood 5, California.

ACCESSORIES

ALFA Spider owners. Easily installed attachment guarantees stopping mirror vibration. $2.00 Formula Constructors, Box 33-124, Miami, Fla.

WANT to buy good equipment and accessories? Place a low-cost classified ad in this space.

STOPWATCH for Rallye, race, or gymkhana. Swiss made. Restarts without hands going back to zero. Specify 1/5 second or 1/10 second stops. $16.45 incl. tax. P.P. Order with cash, check or money order. Meadowbrook Distributing Company, Dept. A-101, Box 426, Hicksville, N. Y.

RALLYE Tallye. One dollar will bring you trophies galore. Compact, precision engineered circular calculator that's a cinch to operate. Ppd. Newton Engineering Enterprises, RR #3, Nashville, Ind.

ATTENTION! Ready made full Floor Carpets in stock, for all popular imports. Factory suppliers to Saab and Renault. Custom work at factory prices, if we do not stock your pattern, we have the know how to engineer anything in carpets. Write for quotes and info. Immediate attention. L. H. Tallmadge Co., Inc., 83 Crawford St., Cranson 10, R. I.

SIDEWALL Saver—prevents cracking of sidewalls caused by oxidative degradation or ozone-laden smog. Provides greater safety for freeway and turnpike driving. Easily applied. Ample Sidewall Saver for five tires is $2 postpaid. Arrell Chemical, Box 985, New Haven, Conn.

WIRE wheel service. Complete repair on Foreign and Antique, Special 60 spoke wheels for popular sports cars. Precision Wheel Service, 413 Bowdoin St., P.O. Box 23, Dorcester 22, Mass. GEneva 6-4575.

JUST Out! New 388-page, illustrated Catalog offering savings up to 50% on over 100,000 auto parts and accessories, many hard to get Model "A" parts. All makes (1920 to 1961 models), trucks, foreign and sports cars. Also Karts and accessories, Hollywood accessories, custom styling, Hi-Speed Equipment. Send 25¢ for postage, packing—refundable on first order. Whitney, 1919 JJ-4 Archer, Chicago 16, Ill.

THUNDERBIRD Hardtop. $195. Pickup only, will not ship. 264 St. Albans. South Pasadena, California, mornings.

MOTOR Sports Book Club offers motoring enthusiasts books, records and assesssories at reduced prices. Members receive free bonuses and monthly bulletins. Write today for brochure. Box 2465 A, Grand Central Station, New York 17, N.Y.

ACCESSORIES, rally equipment, Curtas, Stevens calculator. New catalog. Sports Car Specialties, Box 66, BV Station, Brooklyn 12, N.Y.

ALFA Romeo and BMC parts, Alfa 1500 cc conversions, exchange engines, gearboxes, differentials—immediate delivery—Stoddard Imported Cars, Inc., Rt. 20, Willoughby, Ohio—WH-6-1040.

SPORTS Car Shop Manuals:—Alfa $15.00; Jaguar, Triumph $11.00; Renault, Singer $9.00; Austin, Healey, Hillman, MG, Morris, Riley, Rover, Skoda, Sunbeam, Volkswagen $7.50. Order with cash, check, MO. Motorbooks catalog 25c. Grays (SCI), Hurstpierpoint, Sussex, England.

RALLYE Dash Plates. 1 by 3¼ inches polished brass, engraved $15 doz. Plastic stamped $3.50 doz. Includes name of club, date and name of Rallye. Sappenfield's Trophy Center, 1219 S. Calhoun St., Ft. Wayne, Ind.

AUTO Radios—FM-AM, AM, S.W., Becker, Blaupunkt, Autovox, English, American. For all Foreign and Domestic Cars. Manual radio—$34.00 up. Push-button radio—$45.00 up, FM-AM—$115.00 up. Square Electronics Supply Corp. 150-60 Northern Blvd., Flushing, N. Y. HI 5-2715 Dept. SCI.

SMITHS, Jaeger, Speedometers, and Tachometers expertly repaired and recalibrated, Maximum $7.00 Guaranteed. Snyder Speedometer Service, One Smith Road, Randolph, Mass.

FOREIGN Car Factory Shop Manuals:—Porsche $25.00; Alfa-Romeo $13.00; Jaguar, Standard, Triumph $10.00 each; Renault, Singer $8.00 each; Rover, Sunbeam $7.00 each; Austin, Austin-Healey, Hillman, MG, Morris, Riley, Skoda $6.00 each. Order with cash, check, money order; or send 25c for Motorbook Catalog. Grays (SCI), Hurstpierpoint, Sussex, England.

1961 Hottsparkk Starting Mileage pep $4.50. Varitypers, Multiliths, Mimeographs, I.B.M.'s. EO, Elmsford, N. Y.

GGREG Accessories has it! Race, rallye, convenience accessories for foreign and sports cars. Free low-price list! Dealers inquires! Kumficar imported, hand made replacement mats. All cars! Competitive. Ggreg Accessories, c/o Motorsport Inc., 125 Lincoln Highway, Fairless Hills, Pa.

PRESTO Fire Extinguishers protect cars, homes. Pressurized, brass, guaranteed, bracket. Flashlight size, $4.95. Pound size, $8.95. Pump type 2½ pound dry chemical, $8.95. Martin Goffe, Box 74 AD, Brooklyn 19, New York.

WIRE wheel service, Complete repair on Foreign and Antique, Special 60 spoke wheels for popular sports cars. Precision Wheel Service, 413 Bowdoin St., P. O. Box 23, Dorcester 22, Mass. GEneva 6-4575.

RALLYE Dash Plates. 1' x 3' photo engraved brass. Color filled, ready to mount. Includes Club emblem, date, name of event. Write for samples and details. Metro Engraving, P. O. Box 26, Littleton, Colo.

SPORTS CAR BODIES

FIBERGLAS Sports Bodies—Easily bolts on Crosley, Fiat, etc.—$295. Jaguar, Ford, Chev. etc.—$495. Free Brochure. Almquist Engineering, Milford SC4, Pennsylvania.

NEWEST Fiberglass Gran Turismo. Send $1.00 (refunded on first order.) for brochure to Fiber-Craft, Box 5661, Lake Charles, La.

OWN an old Volkswagen? A new fiberglass coupe body for your car is going into production soon. Outstanding styling and engineering. Write for complete information. M. I. Gould, 23 Shaler Lane, Cambridge 38, Mass.

PLANS & KITS

BUILD your own Racing Car! Plans and instructions for constructing Formula Junior or Formula III car at home. $5.00 each. Dane Racing Cars, Box 451, Pacific Palisades, Calif.

FRAME and Body plans for 170 MPH Street and Racing coupes and Roadsters. Actual photos of these cars $5.00 or send $1.00 for brochure describing all bodies and frames available. Fibroglass Products Inc., P.O. Box 131, Folsom, Calif.

BUILD Your Own Tachometer, (electric) at tremendous savings. Complete plans and instructions, $1.00. Alanne Engineering, Box 135, Watertown 3, Conn.

"BIRDCAGE" Jabro Mk III 750. Suitable for Saab. Crosley, Osca, Mercury, Climax. Build your own. New body! Space frames. New competition dope, 4 port Crosleys! New literature! 25 cents. Jabro, One Sunnymead, St. Louis 24, Missouri.

HOW To Build and Race Hot Rods. 144 page book shows how. $2.75. Davenport & Waldon, Box 692, Inglewood, Calif.

MISCELLANEOUS

MAGNIFICIENT full color prints. World Famous Sports Cars, 6 large 12"x14" suitable for framing, value over $12, only $1.50 postpaid. Borden Publishing Company, 3077 Wabash Ave., Los Angeles 63, California.

EMBLEMS—Custom designs made to order. Any 2 colors —Velvety design on 100% wool felt. Send rough sketch or sample with order. 6 or more, Postpaid, 4" size—$1.00 ea. 5" size—$1.20 ea. 6" size—$1.50 ea. 8" size—$1.75 ea. Check or M. O. No COD's. International Crestmark, Plaistow 23, N. H.

DETROIT Consumers Newsletter. Biweekly unbiased automotive industry authority. Experts depend on it for information of secret automative projects. Your free copy. Box 4812E, Detroit 19.

EUROPEAN Photos: 11 x 14, Mounted, of 1960 season. Hill Climbs, Gaisberg, Rossfeld, Friberg. Solitude GP, Innsbruck, etc. Great for den or Show room. Set of three Postpaid $5.00. State race desired. Albert Reynolds II, Fleiglerhoist 181st, Bad Aigling 13b, Germany.

SHOPPING GUIDE *Classified*

A HANDY GUIDE TO PRODUCTS AND SERVICES NOT NECESSARILY AUTOMOTIVE, BUT OF WIDE GENERAL INTEREST.

STAMPS & COINS

TERRIFIC Stamp Bargain! Israel-Iceland-Vatican Assortment—plus exotic triangle set—also fabulous British Colonial Accumulation—Plus large stamp book—All four offers free—Send 10¢ to cover postage. Empire Stamp Corp. Dept. Z2, Toronto, Canada.

COIN Collectors largest newspaper. Twice monthly, sample 25¢. $2.00 yearly. Numismatic News, 232 Water Street. Iloa. Wis.

PHOTOGRAPHY, FILM EQUIPMENT & SERVICES

OPTICAL-Science-Math Bargains—Request Free Giant catalog "CJ"—144 pages—Astronomical Telescopes, Microscopes, Lenses, Binoculars, Kits, Parts, Amazing war surplus bargains. Edmund Scientific Co., Barrington, New Jersey.

FREE. New 1961 catalog of all photographic books available. For your copy, send postcard with name and address to Catalog, Popular Photography Book Service, One Park Ave., New York 16, N. Y.

EMPLOYMENT INFORMATION

CIVIL Service Jobs—overseas. U. S. A.—mechanical, clerical, professional. List $1.00. Civil Service Bulletin, 115K Haypath Road, Plainview, New York.

OVER 165,000 buyers and sellers will read your ad when placed in this space. It costs only 40¢ per word; minimum of 10 words including your name and address.

BUSINESS OPPORTUNITIES

SPORTS Car dealers! Someone "borrowing" your personal copy of Sports Cars Illustrated each month? You ought to be taking advantage of Sports Cars Illustrated's convenient re-sale plan. Sell copies in your showroom—perform a good service for your customers —with no risk involved. For details, write: Direct Sales Department, Car and Driver, One Park Avenue, New York 16. New York.

MISCELLANEOUS

TAPE Recorders, Hi-Fi Components, Sleep Learning Equipment, Tapes, Unusual Values. Free Catalog. Dressner, 1523 Jericho Turnpike, New Hyde Park, N. Y.

"WINEMAKING, "Beer, Ale." Highest powered methods. Illustrated. $2.20. Eaton Bookstore, Box 1242-V, Santa Rosa, California.

QUICKSILVER, Platinum, Silver, Gold. Ores Analyzed. Free circular. Mercury Terminal, Norwood, Massachusetts.

KONI

ADJUSTABLE SHOCK ABSORBERS

20,000 Mile Guarantee

- Every KONI is performance tested
- Individually engineered for each car
- Precision adjustment up to double damping
- Double action, bump and rebound
- Life beyond comparison

Treat yourself and your car to the most enjoyable and safest ride—on road or track

BOSTON, MASS. Automotive Imports Distributors, 7 Washington St., Wellesley Hills, CE 5-3344
DENVER, COL. European Auto Parts, 988 Cherokee St., Denver 4, AC 2-0835
DETROIT, MICH. Imported Motor Parts, Inc. 22600 Woodward Ave., Detroit 20, BR 2-0073
HARTFORD, CONN. Imported Car Parts of Hartford, Inc. 421 Park St., Hartford 6, JA 7-5124
MIAMI, FLA. Import Motor Parts Co., Inc., 2717 N.W. 34th St., Miami 42, NE 4-4551
LOS ANGELES, CAL. Warren Olson Sports Car Service. 631 N. Robertson Blvd., Los Angeles 46, OL 2-7925
SAN FRANCISCO, CAL. Foreign Auto Parts 770 El Camino, San Carlos, LY 1-2601
WASHINGTON, D. C. Sports Motors Ltd., 3912 5th Road North, Arlington, Va., JA 4-1165
NEW YORK Distributors, U.S.A. Factory Representatives:

KENSINGTON PRODUCTS CORP.
240 West 60th Street, Dept. CD
New York 23 JU 2-9343

Sold for PORSCHE by all their Distributors

ISKENDERIAN RACING CAMS

PUT SPORT IN SPORTSCAR RACING

PORSCHE 1600 (E-Production Class) triumphs in both days at big Santa Barbara meet. George Follmer does trick with aid of new Iskenderian 108 Comp. Cam.

NEW FOREIGN CAR GRINDS

FIAT FF-51 (Comb. Road & Competition)
New MGA T-55 (Competition Grind, 7500 RPM)
New VOLVO VV-51 (Combination Road & Comp., 7500 RPM)

VALVE TIMING FOR MAXIMUM OUTPUT:

Illustrated 80 page book. Only $1.00

NOTE: Iskenderian is the only cam grinder engaged in full time development of racing grinds for foreign cars. Write direct to our Technical Assistance Dept.

WRITE FOR NEW CATALOG
Complete listing on all types of grinds and kits available. A must for all engine builders. only 25c (postage prepaid)

ED ISKENDERIAN
607 N. Inglewood Ave., Dept. SCI-5 Inglewood, Calif.

DUAL ELECTRIC RALLY ODOMETER
100ths OF A MILE—NO STOP AT SPEED CHANGE
WRITE FOR INFORMATION
INSTRUMENT REPAIRING
SPEEDOMETER or TACHOMETER—8.50 plus parts
Temperature Gauge 10.00 Oil or Fuel Gauge 6.50
Clocks 6.50—MG TACH-DRIVE Gear Box Rebuilt 12.50
Use our heavy duty Speedo. Cables for best results.
PAUL SULLIVAN SPEEDOMETER SERVICE
4311 SUNSET BLVD. HOLLYWOOD 29, CAL.

INSTANT GOODIES

AUTO TOP LIFT for Hardtops.....$8.95
FREE CATALOG
Everything for Sportscars, Corvettes, small T-Birds, imported cars
JAMES AUTO SPECIALTIES
Box 151M, Pasadena, Cal.

April 1961

Car and Driver

INDEX OF ADVERTISERS

Advertiser:	Page No.
Alexander Engineering Co., Ltd.	96
Allard Motor Company	96
Allen, Don	84
American Carry-Products, Inc.	78
Arnolt Corporation	88
Aston Martin	77
Bakers Worldwide Auto Parts, Inc.	89
Barker Motors, Inc.	84
Bentley, Inc., Robert	1
Car and Driver Book Service	91
Castrol Oil	80, 81
Centurian Motor Distributors, Corp.	78
Charmont Imports	96
Chevrolet Division	19
Chrysler Corporation	11
Derrington Ltd., V. W.	90
Dietz Engineering Co., O. W.	96
Dodge Division (Lancer)	7
Ducommun Company, M.	84
Dunlop Tire & Rubber Co.	8
Electric Autolite Co.	3
Fergus Imported Cars, Inc.	90
Fisher Products	20, 75
Ford Motor Company (Ford Division)	3rd Cover
Geon International	88
Haan Incorporated, Vilem B.	17
Hambro Automotive Corp.	2nd Cover
International Automobile Show	86
International Automotive Imports	78
Iskenderian, Ed	96
Jaguar Cars, Inc.	4th Cover
James Auto Specialties	96
Judson Research and Mfg. Co.	12
Kendall Refining Company	22
Kensington Products	96
Konner Chevrolet, Malcolm	82
Lev-Lite Electronics	80
Lotus Cars	83
Lucas Electrical Services, Inc.	25
Marken, Ltd.	6
Mercedes-Benz Sales, Inc.	23
Mitten, M. G.	14
Moon Equipment Co.	92
Mosko Italian Motors, Aaron	84
Overseas Motor Corporation	88
Pirelli Tires	26
Plastic Dynamics Sales Corp.	80
Porsche of America Corporation	13
Purdy Opticians	86
Quaker State Oil Refining Company	16
Racers	88
Rallye Motors	82
Ramcote Products	90
Riverside Records	15
Rootes Motors, Inc.	9
Rosemont Productions	4
Royze, Incorporated	82
Saab Motors, Inc.	21
Simca	24
Southwest Imported Auto Parts	81
Sports Car Manuals Co.	81
Stewart-Warner Corp.	82
Sturtevant Company, P. A.	92
Sullivan Speedometer Service, Paul	96
Tec Auto	86
Vigilante Enterprises, Inc.	86
Volkswagen of America, Inc.	5
White & Bagley Co., The	10
Wilco	84

WANTED!

Used Sports Cars, Equipment, or Accessories!

The 175,000 purchasers of CAR and DRIVER (formerly Sports Cars Illustrated) are always in the market for good used cars or equipment. If you have something to sell, use CAR and DRIVER'S classified columns. They bring fast results. And it costs very little: 40¢ a word, including name and address. Minimum message: 10 words.

For further information write: Martin Lincoln, CAR and DRIVER, One Park Avenue, New York 16, N. Y.

CAR CLUB BADGES

Original designs produced in Europe. Any design, shape, color or quantity (10 to 10,000). Prompt delivery. "Impossible" designs fabricated with ease. For estimate, send sketch or idea and approximate number of badges you'll need to:

MADE TO ORDER!
✓Solid Brass
✓Baked Finishes

CHARMANT IMPORTS
Garden City 44, New York

ALEXANDER

Twin Carb. and Modified Head Conversions.

Minx. Ser. 1-3 includes floor gear shift	$216.
Minx. Ser. 3A & B floor gear shift model only	$187.
Austin A40 and Morris Minor 1000	$153.
Austin Healey Sprite	$246.
Triumph Herald	$250.
Austin 7 and Mini Minor	$153.
Simca Aronde (carbs. and manifold only)	$ 80.
Cross Flow Alloy Head BMC 'A' Series	$250.
Cross Flow Alloy Head BMC 'B' Series	$210.

All above prices packing and carriage paid. High Lift Camshafts and carbs. or manifolds only for above can be supplied. Full details of all items on request to:—

ALEXANDER ENGINEERING CO. LTD.,
Haddenham, Bucks. England.

DUAL CARBURETOR MANIFOLD KIT for VOLKSWAGEN

- Uses stock Volkswagen Carburetors and air cleaners.
- Fits Volkswagen sedan, Ghia Coupe, and truck.
- $48.00 prepaid. *Write for free brochure*

O. W. DIETZ ENGINEERING CO.
P.O. Box 35, Harper Sta., Detroit 13, Mich.

ALLARDS for SUPERCHARGED FORDS
Allard Motor Co. now sole Distributors for the WONDERFUL SHORROCK SUPERCHARGER FOR ENGLISH FORDS
Full details from Allard Motor Company. 24/28 High St. Clapham, London, S. W. 4. Telegraph ALMOTCO. LONDON.

Printed in U. S. A.

Darlington 500 winner Johnny Mantz does brake test at the Ford Test Track, Kingman, Arizona.

Test Driver Johnny Mantz proves it for himself!

STOCK CAR ACE HALTS NEW FORD FROM 115 MPH. IN 11 SECONDS!

" We're at Ford's Arizona Proving Ground. My assignment - to wind up a big new Galaxie to one-one-five ... then lock up the anchors on a panic stop. I move away from the line ... then mash down and the needle jumps like a jet's altimeter. The car feels strong - real strong. Then bang! I'm on those big brakes and the Ford and I are fighting g's. In eleven seconds, I'm stopped - no pull - no fade - just straight-line deceleration. Man, this new Ford's got goin' and slowin' like nothing else! And it's built to take care of itself ... even adjusts its own brakes, automatically."

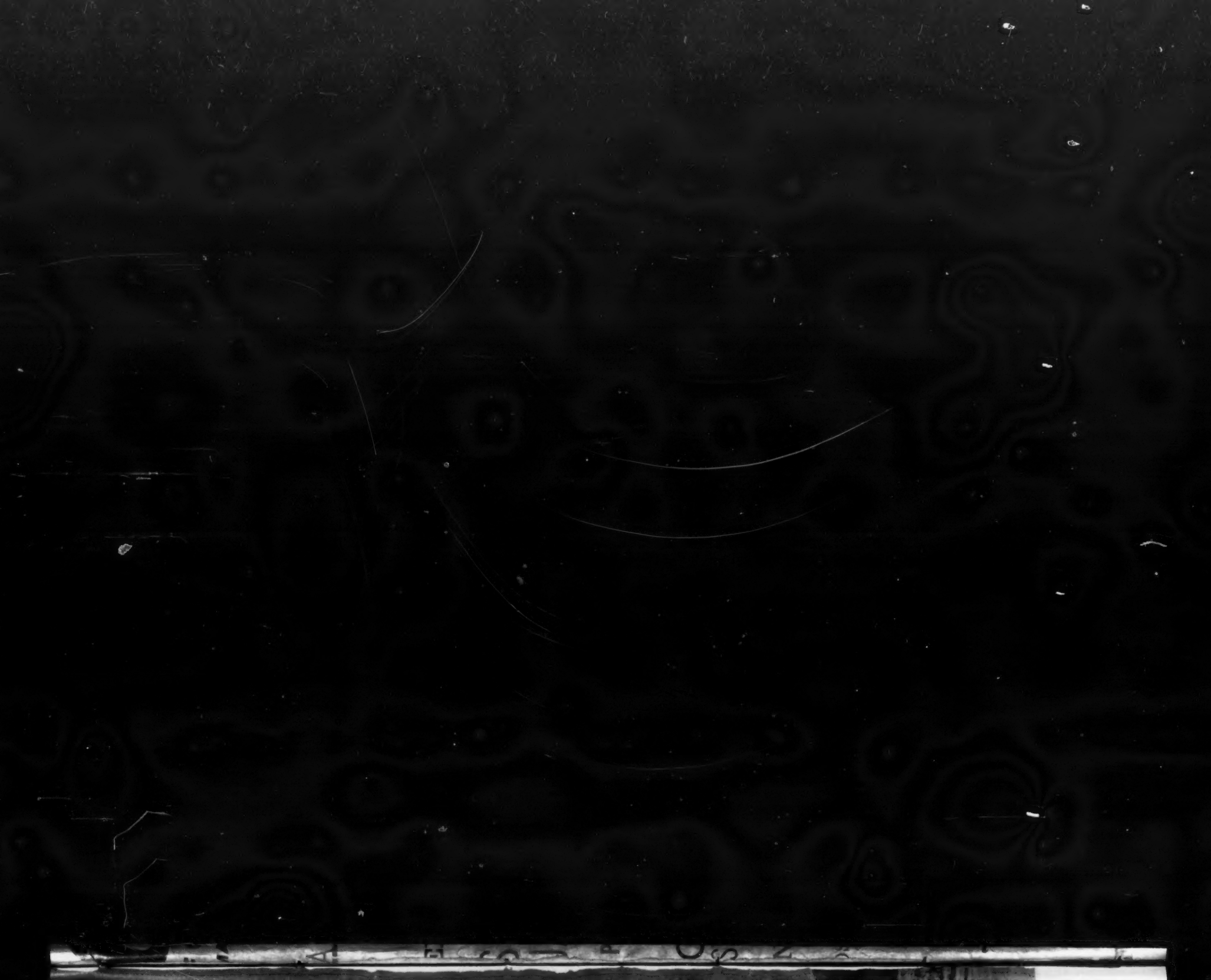
Johnny Mantz

THE '61 FORD!

BEAUTIFULLY BUILT TO TAKE CARE OF ITSELF!

FORD DIVISION, Ford Motor Company

What is the secret of its splendid indifference? The Jaguar 3.8 Sedan, unlike most cars on the road today, has been engineered *without compromising motoring excellence.* Race-tested XK engine, proven 4-wheel disc brakes, "four-square" suspension system, quick, responsive power steering, automatic transmission—see and drive the 3.8 today. (Also Mark IX Sedan and XK-150 Coupe or Convertible.)

JAGUAR

JAGUAR CARS INC.
32 E. 57TH ST., N. Y. 22, N. Y.